Engineering News, October 19, 1961

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No. 3 October 19, 1961

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

Every Thursday, Price 4d

F. W. Bridges and Industrial and Trade Fairs transform the long-established

Engineering and Marine Exhibition into eleven-day display

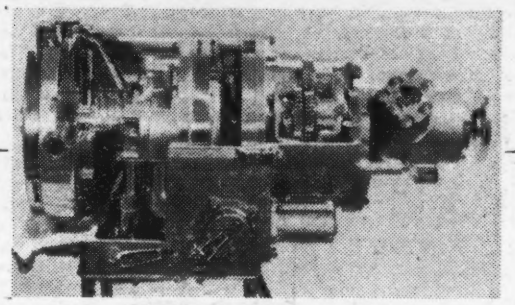
EUROPE'S BIGGEST-EVER SHOW WILL BE IN LONDON

HEALTH AND THE VIP

SPEAKING at last Monday's conference at Newcastle on safety in the shipbuilding industry Mr. E. J. Hill, chairman of the Shipbuilding Sub-committee of the Confederation of Shipbuilding and Engineering Unions, emphasised the importance of keeping higher management healthy.

"It is nothing for a director to go by air say to America, Africa or Asia," he said, "as he goes East or West the time changes, and for the few days he is away he has breakfast when he would normally have supper, and lunch in what would at home be the middle of the night, and naturally his inside objects.

"Then he wonders why he feels rotten and his temper is bad. His staff could tell him. Perhaps it is time they did."



The 'Mecha-Matic' transmission.

1,000th hobber is handed over

COMPLETION of the 1,000th gear hobbing machine, the Rigidhobber, by Churchill Gear Machines Ltd. marked an important occasion for the company, which has now successfully produced over £5 million worth of Rigidhobbers.

The machine, which was recently handed over by the chairman of the Charles Churchill Group, Mr. J. B. S. Gabriel, will be used on a project of great interest to the motor industry—a Hobbs Mecha-Matic gearbox.

This gearbox, manufactured by Gresham and Craven Ltd., is designed to meet the need for a low-cost unit having a fully automatic type of mechanism, giving all the advantages of automatic speed selection but, at the same time, permitting the driver to control the gear selection at will.

Fully tested

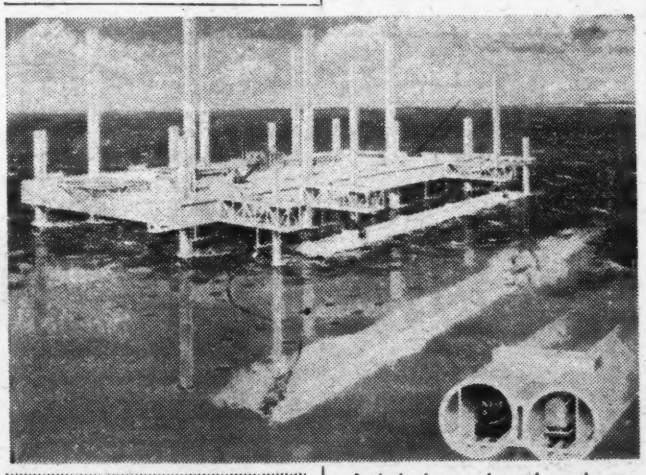
Other advantages of the unit include improved engine braking, smooth selection through all gears owing to the hydraulic circuit employed and low power loss.

The unit has been fully developed and tested and is suitable for all ranges of vehicles from 980 c.c. upwards, including racing cars.

In the latter field, its value was demonstrated when it was installed

● Continued on back page

'CHANNEL BRIDGE TOO DEAR'



Artist's impression of work on a cut-and-cover type Channel tunnel.

TOO expensive and too low-yielding in revenue. This was the judgment on a future Channel bridge delivered in London this week by Mr. Leo d'Erlanger, chairman of the Channel Tunnel Company.

Quoting the familiar figures—£105 million to build the tunnel, £210 million for a bridge—the Channel Tunnel chairman said:

"The revenues would be inadequate to make a bridge project a commercial proposition."

All the road vehicles which were carried over the Channel by either sea or air in 1960 could have been moved through a tunnel in three or four days.

At a conservative estimate it was thought that the tunnel could be completed five years from a decision to go ahead.

Olympia AND Earls Court are booked

BRITAIN is to have the largest international engineering exhibition in Europe.

The long-established Engineering and Marine Exhibition is to be transformed into an eleven-day super-exhibition using the million square feet of space at Olympia and Earls Court and immensely enlarging the foreign participation.

To be held from Tuesday, April 23, to Thursday, May 2, 1963, the exhibition is to be named the International Engineering Exhibition.

It is being organised jointly by F. W. Bridges & Sons, who have run the former Engineering and Marine Exhibition, and Industrial and Trade Fairs, who conducted the successful British Trade Fair in Moscow this summer.

At least 1,200 exhibitors are expected to book space in one or other of the halls.

Early inquiries have come in from manufacturers in Germany, France and Sweden and interest has been indicated from the US,, and the USSR.

World's buyers

Mr. V. G. Sherren, managing director of Industrial and Trade Fairs, said:

"It will establish in London the largest international engineering exhibition in Europe, drawing buyers from all over the world to see what our industry can do."

Mr. Robert W. Boardman, managing director of F. W. Bridges and Sons, said: "It is only by this extra space that we are able to make the exhibition international. The buyer will now be able to see a much wider range of machines and equipment, and he will see exhibits from overseas in much larger quantity."

1,200 firms will be exhibiting

The stands area of the exhibition, Mr. Boardman calculated, has now risen to exactly double that of the last, the 23rd Engineering and Marine Exhibition.

Earls Court will include the stands with the lighter products and electrical engineering.

Olympia will take the heavier exhibits including a welding section—an exhibition in itself.

Government stands, more for information than prestige, will be limited to 1,000 sq. ft. each and are expected from a number of European and other countries.

For its first three days the International Enginering Exhibition will overlap the big Hanover Fair in West Germany.

Mill to cost £1m.

A £1 MILLION reversing blooming mill for the Park Gate Iron and Steel Company is to be built at Rotherham by Davy & United Engineering.

The intention of Park Gate is to expand its annual ingot capacity from 425,000 tons to 800,000 tons.

The company is part of the Tube Investments Group and the increased steel output is needed to assist in providing for the internal needs of the group as well as for the products of Park Gate going directly to its own customers.

Make certain you get your own
ENGINEERING NEWS
every Thursday by completing the coupon on Page 23 TODAY

Mr. J. Mills, of C.G.M., holding a pinion for the new gearbox.

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THAT LEAD SCREW!

'On my first lathe 40 years ago...'

REPLYING to Mr. W. Mannheim (October 5 issue), when I worked on my first lathe 40 years ago, the lathe being then some 80 years old, I was told that the lead screw had been made in the shop by wrapping a strip of paper round the shaft to form a spiral, marking the edge of the paper with a centre punch and chipping and filing the groove to form a thread.

This had been the way that Joseph Whitworth had made his first lead screw. However, screw threads must have been known for hundreds of years before that e.g. in Caxton's press if not in the Archimedian screw.

Any old turner would "strike" a thread by hand with a chaser 40 years ago.

Whitworth, however, made an advance by compensating the irregularities of his imperfect thread by providing a track on the bed, along which rode a lever, which turned the nut in the saddle to and fro slightly.

It is of interest to note that his lathe would not copy the screw correctly unless the gears were also kinematically correct.

B. WOOD
Esher, Surrey.

★

AND ANOTHER

ALTHOUGH I am unable to answer Mr. Mannheim's query, he may be interested to know that there is a sketch of a screwcutting lathe in Klemm's "A History of Western Technology" (page 97), copied from a drawing in "Das Mittelalterliche Hausbach" dated 1480

J. F. PERRIN.
6 Cavendish Avenue,
Welling, Kent.

★

IN reply to your correspondent W. Mannheim, the first lead screw is reputed to have been made by Henry Maudslay. The details of his method can be obtained from the "Maudslay Society", Secretary R. Scott, Castle Maudslay, Maudslay Motor Co. Ltd., Alcester, Warwicks.

I should like to say how much I enjoyed your first copy and hope the venture is a success.

R. CARTER, A.M.I.Mech.E.
25 Bute Crescent,
Shotts,
Lanarkshire.

LIKE Mr. Mannheim, I have never heard of an authentic record, but as an apprentice the hearsay tale related this to Maudslay, and the method was the triangle of paper.

This was cut to the required pitch and wrapped round the shaft to give the thread line, by scribing, or cutting through on to the shaft.

The thread was then cut by chisel, and or file. The nut or half nut was cast on.

W. L. FISHER
38 Chichester Drive, West,
Saltdean, Sussex.

Letters to the Editor

HOVERCRAFT? It was only a fluke

AS usual with a Heywood publication, you have hit a vital nail squarely with your very first leader. You say the British engineering industry needs rousing; the long-term position is unhealthy; that a gigantic effort must be made to catch up on development; and that engineers abroad are no longer looking to Britain for new ideas.

It is a grotesque position that we live in today. While thousands of inventions per annum are lost here by failing to arouse interest (many of which are subsequently exploited to the fame and fortune of others) British firms are, as you admit, searching out foreign designs to manufacture under licence.

We make the advance, fail to seize the opportunity, and then pay in sterling to be allowed its partial use when it is no longer new!

You cite Hovercraft as an example of what we can do when we make the effort. I submit it is a far better example of the lethargic mess we are in.

For eight years it met with nothing but interminable frustration and neglect, and but for a final fluke it would doubtless have gone the way of those thousands of other inventions. Even now, it is uncertain whether it is developing here as much as it is overseas.

More lively

We once led the world. As we cannot hope to out-produce every competitor for reasons of physical size alone (to say nothing of high wages, strikes, etc.), then we should at least endeavour to adopt a more lively and anxious attitude towards new advances.

Indeed, it would suit us better temperamentally as well as economically to gain our main wealth less by magnitude of production and more by technical and practical superiority and leadership.

Moreover, by recovering something of our former creative glory we should gain prestige — always the most telling selling-feature one can possess—and be able to gain income by leasing rights, as Rolls-Royce have done with their famous jet engines.

Our deficiency is not shortage of ideas, but an apparent inability or unwillingness to reap their fruit.

The inventor meets with apathy and discouragement here, while those in other countries are actively cultivated. It is high time all inventors made themselves much more felt, in the national interest if not in their own; after all, it is on them that our material welfare more profoundly depends than on anything else.

J. R. C. MOORE.
Little Melton,
Norwich.

"... he cut his first tooth today."

Apprentices' column?

I READ your newspaper with great interest; it seems to fill a much neglected gap! Especially as it falls within the price range of apprentices. We might even have our own column one day!

Your article about the new I.B.M. typehead is not entirely accurate as my company, Creed Co. Ltd., Croydon, have been using this system of fixed carriage and mobile typehead on their model 75 teleprinter.

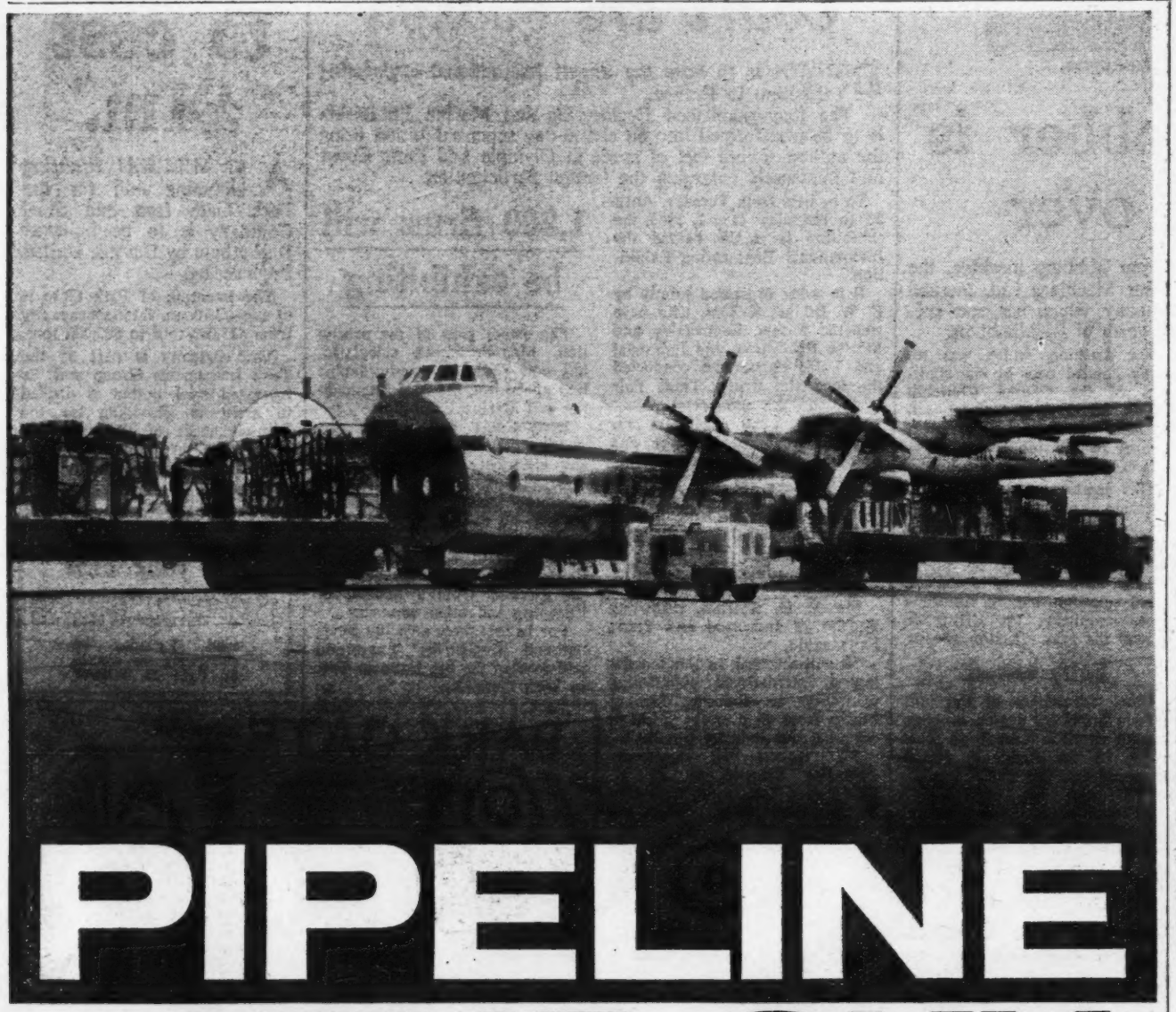
On this machine the typehead traverses along two or three splined shafts.

B. ECCLES.
84 Parkway, Addington,
Croydon, Surrey.

Sailors ho!

PERHAPS you can find space to deal with boats of the air-propelled variety. I can see no reason why an air-driven boat should not be built which excludes the necessity to "tack," thereby saving miles of unwanted mileage.

NORMAN LEITH-HAY-CLARK
19 Grove Court,
Drayton Gardens,
London, S.W.10.



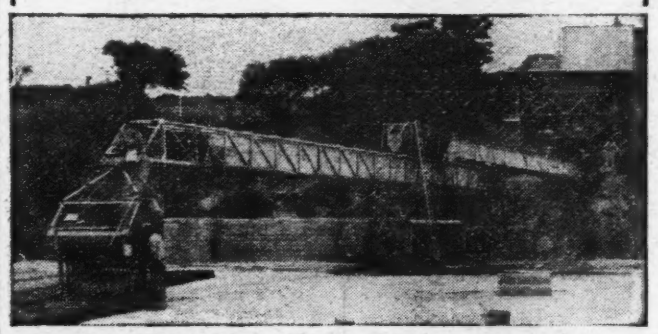
PIPELINE IN THE SKY

Riddle Airlines Inc. are flying British turbo-prop Argosy air freighters up to 13 hours daily on the U.S.A.F. Logair routes. Logair is one of the world's largest scheduled cargo operations—an aerial pipeline for the quick supply of urgent military equipment. ☐ From coast to coast these new Armstrong Whitworth aircraft, with their special Rolamat quick loading systems, speed outsize military cargoes in their capacious holds, over a network of routes covering the U.S.A. Daily schedules bridge more than 12,000 miles. ☐ Soon, B.E.A. will be doing the same on their all-freight routes. Argosies will open up new high-speed supply lines for outsize cargoes between the U.K. and Europe. ☐ The Argosy is the only aircraft in the world with truck bed height double-end loading. Using the Rolamat cargo handling system, up to 13½ tons of bulky freight can be loaded swiftly through the full-width doors at each end of the 47 ft. long, 6 ft. 8 ins. high, 10 ft. wide fuselage.

This fast turbo-prop freighter offers:
To the manufacturer—large dimensions, minimum packaging, less insurance, negligible damage, high speed transit, less dismantling and reduced dispatch charges.
To the customer—quicker and cheaper delivery, reduced stocks and inventories, more positive supply schedules.
Transportation economics for machinery or other special equipment can now be considered at the early planning stage.

HAWKER SIDDELEY AVIATION
32 Duke Street, St. James's, London, S.W.1.

CONVEYOR BELT OUSTS TRUCKS



AN efficient method of transporting the mix (pictured above) to a concrete block-making machine has been developed by T. and T. Works Ltd. of Billesdon, Leicester, from an idea put forward by Messrs. E. B. Best, St. Andrew's Brickfields, Guernsey.

The modern block - making machine is constantly moving and this usually means that mobile trucks with tipping buckets are needed to keep it supplied with mix from the mixing area.

Steady flow of mix

By building a conveyor which is telescopic and can also swing in a wide arc, a steady flow of mix to the machine is maintained, without the aid of vehicles.

The outer end of the inner conveyor has a support running on a track radial from the pivot point under the central mixing plant.

Steel test is simplified

TESTS have now shown that measurement of aluminium content is a quicker, cheaper, and more reliable way of evaluating the grain size of steel than the McQuaid-Ehn test.

Recent tests by the British Iron and Steel Association sought the aluminium percentage needed for grain control.

They found that grain coarsening temperature rises in proportion to aluminium content up to a 0.04 per cent maximum. A 0.01 per cent minimum is needed for consistent fine grain size.

It was also shown that the moulds and pouring trumpets are the most economical points to add the aluminium.

SCOTLAND GETS STRIP MILL

Steel rolling industry is ready to start work in Lanarkshire by December

THE first continuously rolled, thin wide steel strip ever finished in Scotland will come out of the new £14 millions cold reduction mills at Gartcosh, Lanarkshire in December.

The main cold rolling mills, supplied by Davy-United Engineering Co. of Sheffield, are now practically ready, but a certain amount of work remains to be done with the "temper" rolls which put on the finishing touches.

30 ton coils

The Gartcosh mills, designed to turn out strip from 28 to 61in. wide, in coils up to about 30 tons in weight, will make a start with hot-rolled strip, from the South.

Later on, they will reduce material railed over from the semi-continuous hot strip mill now being completed at the new Ravenscraig steel works, Motherwell, about seven miles distant.

This £60 millions mill is expected to be ready for operation about the middle of next year. Its initial capacity will be about 675,000 tons a year, taking in light plates, black sheets and strip for cold rolling. About 400,000 tons a year will be earmarked for the parallel Gartcosh mills, also owned by Colvilles.

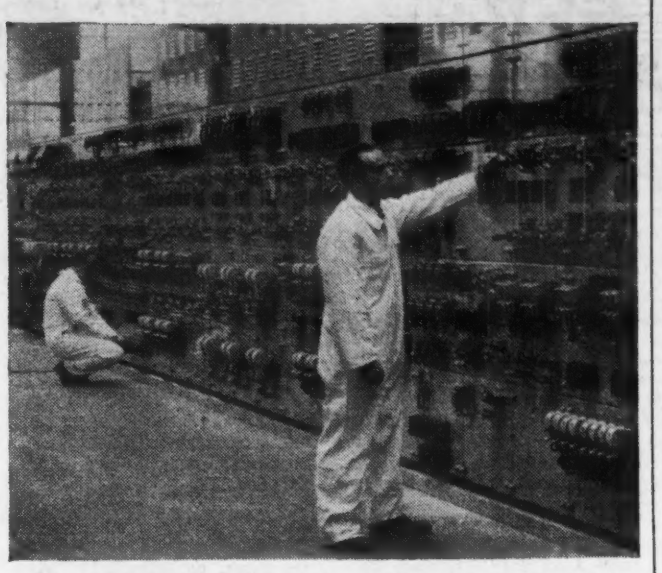
The capacity of the main train of cold rolls at Gartcosh is rated at about 15,000 tons a week. But the single stand of "temper" rolls, which flatten and put a final skin on the material, can deal with only 8,000 tons a week.

"Engineering News" understands, however, that a second stand of "temper" rolls will be installed, as and when the market position warrants. The foundations have already been set. The Gartcosh plant has in fact been specially designed and laid out to permit of systematic extensions.

Good progress made

Engineers at Gartcosh were able to progress well up to, and in some departments, in advance of schedule as the site offered particular construction advantages. Taking advantage of the stiff boulder clay which occurs in the locality, the "cellars" underneath the plant could be excavated with the minimum of shuttering.

The twin Ravenscraig hot strip mill and the Gartcosh cold reduction plant (run by the Smith and McLean subsidiary of Colvilles) were authorised by the Ministry of Power in 1958.



Two open-type switchboards for Colville's new strip mill at Gartcosh, Glasgow, are being built by Brookhirst Igranic at Bedford.

WEAR REDUCED BY ALUMINIUM ZINC-BASED ALLOY

SAVINGS in time, labour and raw material cost are claimed by Main Metal (Gt. Britain) Ltd., London, for their aluminium zinc-based alloy. It is being increasingly used for bearings in place of bronze, and a 75 per cent. decrease in wear has been reported.

When lubrication breaks down a bearing of this alloy does not seize and metal fragments will not key to the shaft. This allows removal without difficulty or damage.

The material is suitable for shell castings and gives a high finish on gravity and pressure die casts.

The company is setting up a small foundry at Mitcham to produce specialised components.

An example of this special work was an order from Lotus Developments for a selector fork to be used in the gear box of their Grand Prix racing cars.

Changing to this alloy not only eliminated failures but also saved precious weight.

New automatic rotary furnace is sealed

A NEW batch-type rotary drum furnace that prevents treated components from coming into contact with air has been designed by Wild-Barfield Electric Furnaces for gas-carbonising small parts.

This equipment has been delivered to the Austin Motor Co. and comprises a drum about 6ft. long with an internal helix and tumbling flights.

When the drum is rotated in one direction the components to be treated remain at one end where they are subjected to heat from heating elements and a carburising atmosphere of endogas and propane.

The quench tank incorporates an inclined revolving mesh drum entirely immersed in the quenching liquid.

NEW METHOD STOPS TIMBER ROTTING

TIMBERS in the cooling tower at the British Hydrocarbon Chemical works, Grangemouth, have been successfully treated by a new method of impregnation. Hot water cascading through a cooling tower helps to start "soft rot" which works from the surface and "white rot" which commences in the centre of the wood.

At Grangemouth, some timbers had to be replaced while the rest were treated to retain 0.4 lb of copper per cu. ft.

All surfaces were sprayed with copper sulphate and then with sodium chromate. This fixes the copper sulphate and leads to the necessary insoluble deposit of copper chromate remaining in the timber.

The tower was tested three weeks after treatment and it was found that the degree of impregnation had far exceeded the required minimum.

Mr. T. C. Shooter of Richardson and Starling Ltd., Winchester, supervised the work.

He said: "Cooling towers can decay so rapidly that repairs are necessary within seven years of erection. We have succeeded in overcoming the technical problems of *in situ* treatment. The process is new but the chemicals are not.

BISRA meeting on hydrogen in steel

AT the final session of the British Iron and Steel Research Association's Harrogate conference last Friday, papers were devoted to the effects of hydrogen in the welding of steels and the unknown factors relating to its presence.

Dr. C. L. M. Cottrell of Bristol Aerojet Ltd. showed that as the strength of high tensile steel increases the amount of hydrogen which causes embrittlement becomes less.

Therefore, in steels with an ultimate tensile strength of more than 120 tons/sq. in. the fixed fraction of hydrogen which is combined with impurities in the steel assumes greater importance. In fact, satisfactory welding of ultra-high tensile steel may depend upon its purity.

A paper presented for the British Welding Research Association by Mr. F. R. Coe dealt with the welding of low alloy steels.

Hydrogen is introduced into welds by its absorption into the molten weld metal, the content being directly dependent on the concentration of hydrogen in the arc atmosphere.

To reduce the risk of cracking, certain methods can be used. These include the use of large electrodes and high energy inputs, pre-heating the joint to reduce the cooling rate, and low hydrogen electrodes.

Unknown factors with regard to hydrogen in steel were discussed by Mr. K. C. Barraclough of Brown-Firth Research Laboratories. Steel melted under an acid slag contains less of the gas than under a basic slag and an alloy content of chrome or nickel increases the amount.

Inclusions

During cooling, hydrogen will produce porosity, but if the volume is small this occurs just under the skin. Trapped inclusion matter enlarges pore sizes and the use of rusty ingot moulds or damp mould dressing increases porosity.

More unknown factors arise in the solid steel stage than at any other.

Reduced ductility of martensitic steel through hydrogen is well known and there is evidence to suggest that surface condition influences the effect.

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★ *Diametrically opposed sectioning to illustrate uniformity of grain flow.*

The problem here was that any machining likely to interfere with the generation of grain flow through the central barrel to the periphery had to be eliminated. It looked impossible, everything appeared to be against its manufacture, including forging, but as always the seemingly impossible was achieved by Light-Metal Forgings Ltd.

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TAS/CC. 85

PEOPLE in the NEWS

AEI makes big appointment to co-ordinate manufacture

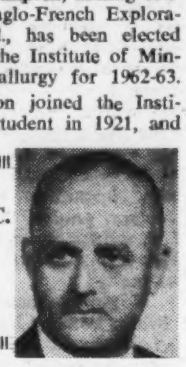
ASSOCIATED Electrical Industries Limited has appointed a director of manufacturing services. He is Mr. A. C. Main. This appointment will ensure the co-ordination of manufacture throughout AEI. Mr. Main will be responsible for the constant review of the standard of manufacturing services and techniques, and the supply of trained and qualified staff in all the factories of the company. He will represent the company in its relations with the employers and labour organisations.

Mr. Main, who was director of manufacture of AEI (Manchester) Ltd., now reports to the AEI Board through the vice-chairman. He remains as a non-executive director on the board of AEI (Manchester) Ltd.

☆

Mr. J. B. Simpson, mining consultant to Anglo-French Exploration Co. Ltd., has been elected president of the Institute of Mining and Metallurgy for 1962-63.

Mr. Simpson joined the Institution as a student in 1921, and



MR. A. C. MAIN

was elected an associate member in 1927 and a member in 1944. He served on the council from 1951 to 1958 and has held office as a vice-president since 1959.

☆

The United Kingdom Atomic Energy Authority announce the appointment of **Mr. H. V. Disney,** at present deputy managing director, as managing director of their engineering group to succeed **Mr. J. B. W. Cunningham,** who is resigning from 20th January, 1962.

Mr. Disney will take over the managing director responsibilities progressively and will have the title of managing director (designate) from 1st November, 1961. He was a member of the original team which started the department of Atomic Energy at Risely in February, 1946, and was appointed chief engineer, Services and Supply, in 1947. In 1950, he became chief design engineer for the diffusion plant at Capenhurst, and in 1957 was promoted to deputy director, Defence Plants, U.K.A.E.A.

☆

Mr. S. W. McCune, deputy managing director of the Du Pont company (United Kingdom) Ltd., has been promoted to managing director, and this promotion will be effective from October 1st, **Mr. M. H. Campbell,** European director of E. I. Du Pont de

MR. S. W. McCUNE

Nemours and Company, has announced.

Mr. McCune succeeds **Mr. W. J. McCoy,** who returns to the U.S.A. on special assignment with the parent company in Wilmington, Delaware.

A graduate in chemical engineering of Princeton University, Mr. McCune has had over twenty years experience in elastomers research and sales work. He joined the parent company in 1940 as a chemist in the company's rubber laboratory, and from 1945 to 1955, he held a number of supervisory and managerial positions, and in 1955 he was appointed district sales manager for the Elastomar Chemicals department. In May 1961, Mr. McCune became deputy managing director.

☆

Important changes in the construction of the board of the Lancashire Steel Corporation, just announced, involve the retirement, after thirty years as chairman, of **Sir John E. James,** who has also given up his posts as chairman of the corporation's subsidiary companies.

Sir John, who is 87, is succeeded as chairman by **Mr. P. E. Holloway,** his son-in-law. A native of Stockton-on-Tees, Sir John began his career in the steel industry as a maker of pig-iron in County Durham, and after serving with a number of well-known companies in the North East, became associated with colliery properties in the Furness group before assuming control of the Lancashire Steel Corporation in 1931.

The new chairman, Mr. Holloway, entered the steel industry via the Cargo Fleet Iron Company, which he joined as a commercial trainee in 1924, when Sir John was chairman. He joined the board in 1950, after a year with the Allied Control Commission. Mr. Holloway is a member of the council and executive committee of the British Iron and Steel Federation and a council member of the Iron and Steel Institute.

☆

The Gas Council has appointed **Dr. J. A. Gray** to be head of the new Basic Research Group which the council is establishing at its London Research Station at Fulham.

Dr. Gray has been Group Leader of Physical Chemistry and

MR. A. LAURENCE

Chemical Engineering at the Battelle Memorial Institute, Geneva, since 1958. He is to take up his appointment on February 1st, 1962.

☆

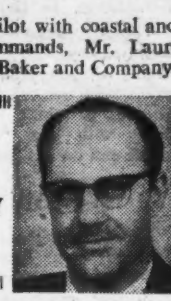
A new director has been appointed to the board of George Salter and Co. Ltd., of West Bromwich to take charge of the company's manufacturing interests overseas. He is **Mr. G. P. Bache,** younger brother of the company chairman **Mr. R. P. S. Bache.**

Mr. G. P. Bache has recently returned to this country from Australia where he was for nine years managing director of the Salter spring balance and spring factories.

☆

Mr. A. Laurence, formerly secretary of Hawker Aircraft (Blackpool) Limited, has been appointed secretary of Hawker Siddeley Aviation Limited. He succeeds **Mr. D. E. Haynes,** who became secretary of Bristol Siddeley Engines on October 1st.

A former pilot with coastal and transport Commands, Mr. Laurence was with Baker and Company



MR. R. CHAFFEY

of Leicester until 1950. He then joined Hawker Aircraft and was subsequently transferred to the Blackpool factory, where he was company secretary until 1958. Since then, he has been with the Plessey Company Ltd.

Mr. Laurence is a chartered accountant, a member of the Institute of Office Management and a member of the National Association of Accountants.

☆

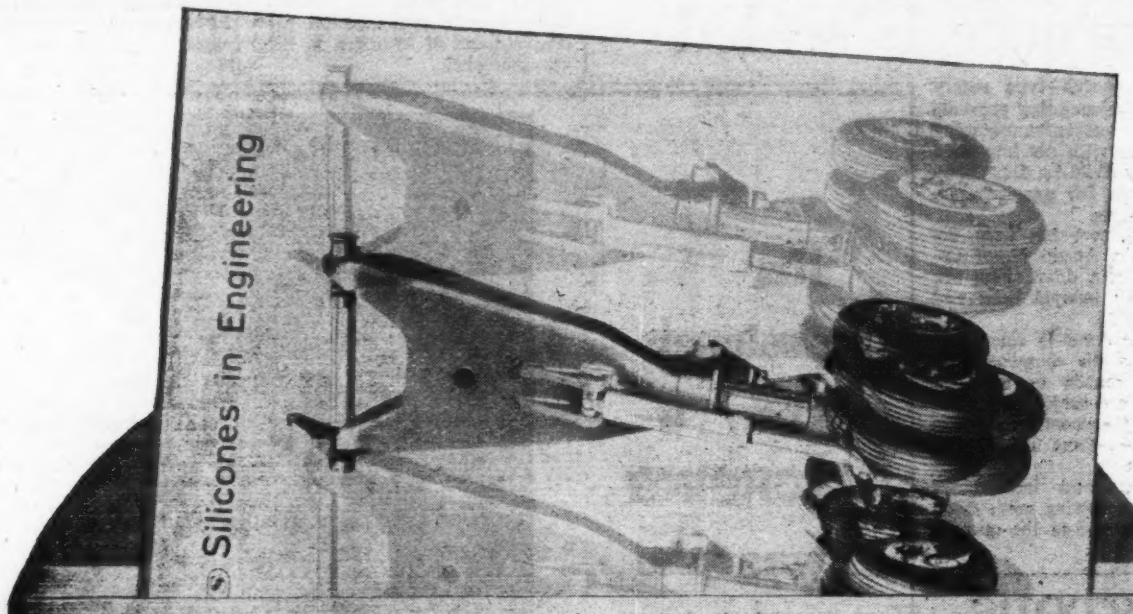
Mr. R. Chaffey has been appointed deputy commercial manager of Marconi Instruments Ltd., St. Albans, with effect from October 2nd.

Mr. Chaffey joined Marconi Instruments in 1940 and from 1945 to 1947 he was a member of the Installations Department. In 1951 he was seconded to the Canadian Marconi Company as head of that company's instrumentation sales department. He returned to this country in 1958 to take up his duties as export manager.

☆

The Brockhouse organisation announces the appointment of **Mr. G. H. Woods** as sales and commercial manager of Thomas Chatwin and Co., Birmingham.

Mr. Woods, who will take up his duties later this month, has had 30 years experience in the Small Tool industry and was formerly commercial manager of the B.S.A. Small Tools Division.



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Coming EVENTS

THIS WEEK

Ends today
14th Engineering Display, Royal Horticultural Society's New Hall, Westminster, London.
Plastics Show of Canada, Toronto.

Until October 21
International Knitting Machinery and Accessories Exhibition, Belle Vue, Manchester.
German Industrial Exhibition, Berlin.
French Metallurgical Society Meeting on Metal Forming, Paris.

Until October 22
International Mechanical Handling Exhibition, Paris.

October 17-26
Industrial Equipment Exhibition, City Hall, Manchester.

October 18-26
International Motor Exhibition, Earls Court, London.

October 19-20
12th Symposium on Corrosion in Nuclear Technology, Paris.

October 24-26
Operational Research Society, National Conference, Leamington Spa.

October 26-November 5
Los Angeles 39th International Automobile Show.

October 30-November 1
Engineering in Plastics, Conference, Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2.

October 30-November 3
Symposium on Welding in Shipbuilding. Institute of Marine Engineers, London, E.C.3.

October 31-November 1
Conference on Engineering with Plastics. The Plastics Institute, Mandeville Place, London, W.1.

October 31-November 2
10th Canadian National Packaging Exposition, Toronto.

November 3-4
Materials Handling Convention Fourth. Connaught Rooms, Great Queen Street, London, W.C.2.

November 7-12
Sixth Meeting and Review of Automation and Instrumentation, Milan.

November 8-10
Testing in Electrical Engineering Savoy Place, London, W.C.2.

November 10-18
43rd Scottish Motor Exhibition Kelvin Hall, Glasgow.

November 13-16
Seventh Annual Conference on Magnetism and Magnetic Materials Phoenix, Arizona.

November 13-16
National Maintenance Conference and Exhibition, Central Hall, Westminster, London.

November 13-18
International Factory Equipment Exhibition Earls Court, London.

November 13-18
Second Engineering Materials and Design Exhibition, Earls Court, London.

November 15-29
29th Building Exhibition, Olympia, London.

November 22-27
Fifth Conference and Exhibition on Automation and Instrumentation.

November 27-December 1
Fifth Congress and International Automation Exposition, New York

Physicists and chemists gather from America, Russia, England, Germany and Japan—from KYOTO KAIKAN comes this report...

It's academic talk now —but soon this will be engineering practice

PROFESSOR L. F. BATES, now in Japan, head of the physics department at Nottingham University, writes on the International Conference on Magnetism and Crystallography.

ALMOST 200 papers were read on general magnetism at a five-day International Conference on Magnetism and Crystallography. Also read at the conference, in Kyoto College, Japan, were another 20 papers on rock magnetism. Delegates had a hard time arranging attendance schedules.

For example, talks on domain structures and magnetisation processes took place at the same time as talks on nuclear magnetic resonance in metals.

Applications of electron microscopy to domain structure problems were described in the first, and magnetic properties of rare earth aluminium compounds were described by a worker from the Bell Laboratories in the latter.

VALUABLE SERIES

Again, a valuable series of communications on anisotropy or directional magnetic properties in ferrites, and associated relaxation or time effects in these materials were presented simultaneously with another series especially devoted to the Mössbauer effect in metals and alloys.

The Mössbauer effect arises when gamma-radiation emitted without recoil from a radioactive nucleus, is absorbed by a metal containing similar, unexcited nuclei, and it might not seem to be of much practical importance.

But, the increasing use of this effect in the investigation of the properties of alloys is sooner or later bound to have repercussions on engineering knowledge.

One of the highlights of the conference was a talk on ferromagnetism and superconductivity delivered by B. T. Matthias of the Bell Telephone Laboratories. There is evidently a close connection between the occurrence of ferromagnetism and the occurrence of superconductivity, but the nature of the connection is veiled in mystery.

Many workers described experiments on the magnetic properties of thin films. Their widespread interest was reflected in papers from America, Japan, England, and Poland, to mention only a few.

The directional magnetic properties of these films is of imperfectly understood origin, and their variations with alloy composition and geometry of evaporation during film preparation were described. The small effects of pressure during evaporation, the effects of residual gases and the influence of minor constituents were also described.

THIN FILM

Thin film switching is now of such operational importance that much interest was shown in the observations which were described on the fine structure in domains and domain walls formed in thin films.

The cause of the important thermal properties of Invar has been in our minds for many years, and therefore a paper by Kussmann and Jessen of Berlin on invar behaviour and the magnetic moments of iron-palladium alloys was welcome, although their conclusions were not definite. Several papers dealt with the remarkable behaviour of manganese in many alloys.

It was amusing to find that some experimental results I obtained in 1928 are now being used in America to support a new theory of first order phase change.

Anistropy and relaxation in metals brought about by the inclusion of cobalt in alloys were discussed by many workers. The addition of small quantities of cobalt to ferrites increased their directional properties enormously, so that they may be magnetically annealed in the same way as perminvar.

Cobalt is the only pure ferromagnetic metal which responds to magnetic anneal; it is possible to increase its directional properties to 90 per cent of the single crystal properties.

It will be remarkable if the enormous quantity of experimental and theoretical work which is now being expended on the subject of the rare earth garnets does not result in some spectacular practical applications in the not too distant future.

Professor Van Vleck of Harvard University gave a masterly survey of the internal magnetic fields which exist in such materials, and their importance in fundamental magnetic studies. One of the few Soviet contributions was a paper on exchange interaction and magneto-optical effects in certain garnets.

YTTRIUM GARNETS

Substitutional changes in yttrium iron garnet were much discussed, and there was an interesting paper on yttrium iron garnet containing small percentages of some nine rare earth elements, from the Mullard Research Laboratories.

Technical magnetisation was not omitted from the proceedings. Dr. Friedlander of Purdue University dealt with flux reversal in square-loop ferrite cores, and he concluded on the basis of double pulse experiments that a model to explain flux reversal must rely on domain wall motion at low fields and rotational processes at high fields.

This is a result which could easily be deduced from the many measurements made on the thermal changes which accompany magnetisation processes; incidentally, the thermal changes which occur during the half cycle of hysteresis in a strained nickel specimen were outlined during this session.

In high (negative) fields rotation processes occur, in lower (negative) fields Nóel spikes are formed and grow into large domains of reverse magnetisation; then, when extensive domain walls have been formed, their subsequent movement with change of field is impeded by strains in a manner discussed by Lilley and Nóel, until when in positive fields the coercive point is passed, the region of rotational processes is reached.

The terms used in the last sentence are now in such general use that engineers dealing with magnetic materials ought to know them.

ODD PHENOMENA

An interesting account was given of some rather unexpected phenomena observed in an electron microscope examination of small ferromagnetic precipitates in air-quenched gold cobalt alloys.

In water-quenched alloys the cobalt is precipitated as disc-like particles, but in the air-quenched specimens almost all the precipitate is clustered in the form of sheets, usually on (100) planes. In the same session a modified torque method for the determination of the anisotropy distribution in ferromagnetic powders was described.

One can hardly imagine that an engineer would trouble to go to a session on the Physical properties of Rock Magnetism; nevertheless, some stimulating papers were given on the antiferromagnetic properties of fine-grained particles of nickel oxide which have been explained in a most convincing manner by Nóel of Grenoble.

If grain size plays an important part in the coercivity of ferromagnetic materials, it now seems that it plays as great, or greater, a part in determining the properties of antiferromagnetic materials, and it will be worth while to watch developments.

Facilities at the conference were excellent. The Japanese had superb projectors, and 35-mm slides were projected with an extreme clarity. Exhibitions of apparatus and materials relating to magnetics and crystallography were held and a new cast columnar alcomax was on view.

NEW MATERIALS

Following the conference, a large number of overseas delegates assembled at the Research Institute for Iron, Steel and Other Metals, Tohoku University, Sendai, for a Colloquium on Magnetic Materials.

The scope of the meeting was not limited to practical applications only; for example, R. M. Bozorth gave an interesting talk on Some New Kinds of Magnetic Materials, in which the peculiar properties of europium oxide and europium iridide played a part. His talk was followed by a wide survey on the Improvement of Cast Permanent Magnets by Professor Shirakawa of Sendai. From this talk it was clear that the Japanese have made a big advance in the production of cast permanent magnets. The shape of the magnetisation curve of what was designated Magnet B was markedly square and H/c and B/c were very high. An application for British patent was pending, however, and the speaker was unable to give further information.

LT UNDERFLOOR LATHE

Wheels trimmed ON trains

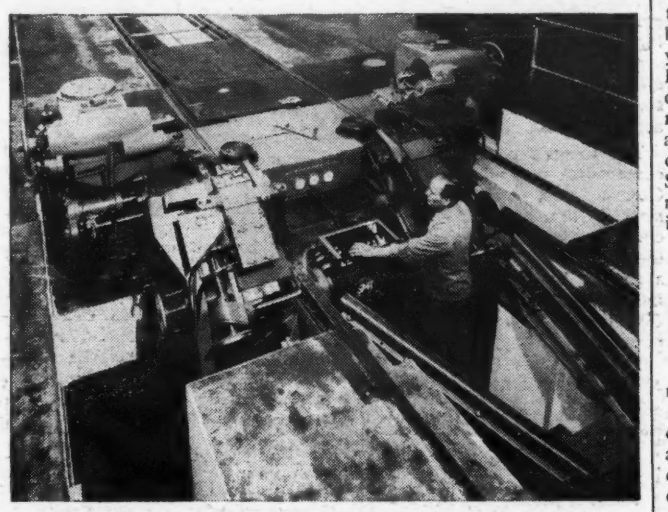
LONDON Transport has brought into use at Northfields Depot an underfloor lathe for machining the whole profile of railway wheels without removing them from the vehicle.

Latest rolling stock designs make frequent removal of bogies unnecessary and, therefore, to be able to restore wheel profiles while in the running position is important.

On earlier lathes, vehicle wheels were rotated by rollers which depended upon the weight of the carriage for adhesion. This limited the power which could be transmitted.

In the new machine the drive is applied by two pairs of rollers on vertical axes which are hydraulically pressed to the inner and outer faces of each wheel tyre. There is no end thrust on axles.

Axle weight is relieved by hydraulic jacks and concentricity is ensured by mounting it between centres with power-operated movement for raising into the working position.



London Transport underfloor lathe shown in the operating position with the cutting tool retracted. The bridge rails are swung back clear of the working area.

The machine works on the copying-lathe principle, the tool being moved by automatic hydraulic equipment across the wheel flange and tread, following a master profile.

Quick power traverse movement of the tool slides in both directions is provided, with infinitely variable ranges of speeds and feeds. Operations are controlled from a bank of push-buttons.

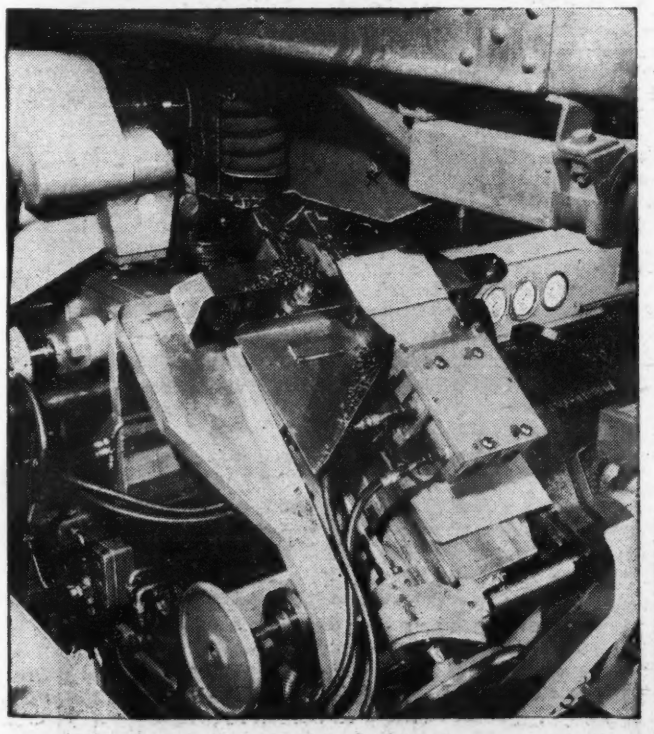
In operation, the carriage concerned need not be uncoupled from its set and only axle-box covers and ancillaries are removed. The car is then winched into position, tailstocks located and locked and the running centres electrically raised slightly above the centre-line of the axle. Precise location is assisted by the provision of recesses in the railheads at the appropriate position.

Axle lifted

The hydraulic jacks lift and line up the axle with the tailstock. By applying the driving rollers machining is then carried out with the electrically raised cutting tool.

A reversal of the sequence permits disengagement of the machine ready for the next car to be winched forward.

The lathe was designed and made by the Scottish Machine Tool Corporation Ltd.



View of the left-hand slide with the tool in the operating position.

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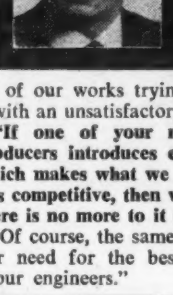
W. GERMANY

Opportunities for Britain within the Common Market

After-sales service will win the Deutsche Mark

THE Common Market challenge to Britain is the biggest single issue since the war.

Engineering News presents a weekly survey of Britain's prospects. This week's report, the third in the series, is from West Germany.



ENGINEERING NEWS sends its Industrial Editor-J. D. F. Perry to report from inside the COMMON MARKET. . .

LONG ago, back in 1950, Britain's exports to a Western Germany struggling to recover from the war were a modest £41.6 million, 4.2 per cent. of the total German imports of £967 million.

By 1960 the total value of exports from the U.K. to a flourishing and wealthy Germany had grown to £166.4 million, still only 4.6 per cent. of the full national import bill which had by then reached £3,633 million for the year.

This is not much more than keeping pace with the increasing size of the market, yet in British and in German cities I have heard responsible industrialists assert that exports from Britain could reach £300 million a year.

How is this going to be done? And which categories of trade can be multiplied to reach this level, approaching 10 per cent of the German import bill of last year?

Part of the answer I received at a breakfast conversation in Bonn, the calm Rhineside capital where the talk constantly returned to the prospects for Deutschmark investment in British companies and to the contribution UK engineering concerns can make to German productivity.

"Specialisation in industry is being carried to greater lengths each year. It is just not worth one of our works trying to carry on with an unsatisfactory machine.

"If one of your machinery producers introduces equipment which makes what we are using less competitive, then we buy it, there is no more to it than that.

"Of course, the same is true of your need for the best products of our engineers."

And this is indeed how it appears to be going.

In the first eight months of this year the greater part of the increase in British exports to Germany were accounted for by the rise in the value of machinery, from £10 million up to the end of August, 1960, to £34 million in the same period of this year.

At the same time German machinery exports to the UK rose from £18 million to £56 million.

This two-way traffic is an accurate reflection of a similarity in the two economies.

Even more than Britain, West Germany has a static labour force. Refugees from the East only partially set off the forecast that by 1970 today's population of almost 56 million people will have declined by two million.

Wage spiral

This means a great concentration on improving individual productivity. For the first time for years German industry is confronted with wages going up well ahead of industrial output.

The immediate future holds even more substantial wage demands, like the claim of the clothing workers for an 18 per cent increase and a working week of 40 hours instead of 43.

Similar, if slightly smaller, claims are coming up in many other sectors of industry. Wage increases definitely achieved in the second quarter of this year varied between nine and thirteen per cent while industrial production in the second quarter grew by three per cent over the second quarter of 1960 (compared with the ten-year average growth of 8.8 per cent).

The effect of all this is to menace the price level, and so to some extent the stability of the economy, a fear in the back of many German minds based on two periods of inflation and widespread misery.

With some of this in mind I was prompted to ask "Why?" when a senior economist of one of the big three banks said: "We really want you to send far more goods to us."

His reply was along the classical lines of seeking to avoid the situation of too much money chasing too few goods.

A long-experienced British representative in Cologne gave me a more down to earth account of the prospects.

Variety wanted

"Very many Germans are becoming accustomed to prosperity. They are now looking for variety. All kinds of consumer products, where they offer a fresh appearance or do something new, have a ready acceptance out here."

Two things are necessary. High executives, preferably speaking German, must spend time in the market, making contacts, discovering what is wanted, learning the modifications which will turn a product line eminently saleable in the U.K. into a success in Germany and the continent in general.

The second is that unless the company intends to set up its own sales subsidiary in the country the best way to sell is through Germans.

The British embassy in Bonn, at 22(c) Friederick Ebert Allee, is particularly well informed on developments in German industry and is a most useful springboard for first inquiries.

They know what is wanted in a way that a lifetime's expatriation might not give to a British representative; they have a different kind of acceptance, and, so I am frequently reminded, they sell extremely toughly.

British successes

Some British companies which have set up in Germany have done very well. A good example is the Matrix GmbH, Frankfurt, sales company of the Coventry Gauge and Tool company.

Preconceived notions on what the market will take are best left behind.

One of the best export stories in Germany concerns British-made carpets.

At the time, some years ago, when salesmen in some of the more modern English furnishing stores were saying that the smart carpet was a distinctive German product, it was widely thought that whatever the quality of British-made Wilton the Germans would not accept floral designs.

In 1958, when only £10,000 worth of British carpets were sold in the Federal Republic, carpet manufacturers exhibited at the Frankfurt Fair and put in an active follow-through.

By 1960, with some modification of colour schemes, British carpet exports in Germany had risen to £600,000 and improvement on this is expected.

The lessons from this favourite example of British business in Germany are these: the product had quality and good design—yet its sales in Germany were negligible—until lively sales efforts were made and some modifications carried through.

Close relations now exist between the German buyers and the U.K. manufacturers; there have been visits, and understanding is based on personal contacts.

This example is worth study by any manufacturer contemplating coming into this competitive but rewarding market.

Vital need

It lacks one vital element. Carpets do not involve spare parts service and the engineers I speak to never stray far from their assertions that trading in aero-engines, motor-cars, internal combustion engines, machine tools and printing and textile machinery to take only a few, demands a good maintenance and spare parts organisation operating from the day on which the sale is completed.

With the English Channel between British engineering firms and their German customers, actual or potential, it is not much good saying that the part will be there when it is wanted if a base has not been set up on the continent.

The creation of a channel bridge or tunnel, should it come, will scarcely change this. The users of expensive machinery like the feeling that the supporting service is based not too far away.

Sound advice

I was told, by an admiring German manufacturer, of a British company who were persuaded to set up a second sales and service establishment not more than thirty miles from their first and who found business growing at a gratifying pace.

The other members of the Common Market, and also U.S. exporters, have all put substantial preparation into giving these services in the well-heeled German market.

Personal experiences and prejudices colour many judgements on motoring and cars but I am being told too often that for British car manufacturers to make a better impact on the market, they must go into service and sales promotion in a much bigger way for the argument not too carry some weight.

I have found some high opinions of some British Motor Corporation models and also a belief that given the sales drive and extensive maintenance arrangements, the British quality cars could become a status symbol of the German executive.

This opportunity is underlined by the way in which the parked cars at a luxury hotel or club will be the same make as the taxis plying around the town.

Summing up

CONCLUSION: From refrigeration plant and scientific instruments to the tools for the aircraft industry, electronic gear and domestic appliances and cars the German market can, and is officially willing to, absorb much larger quantities of British exports — given vigorous selling, first-class service from the outset, and readiness to make necessary modifications.

German competition in Britain, whether or not the Common Market spreads to Land's End, will be based on some very low prices due to intensive rationalisation at home and to the results of long devotion to improving production methods.

A British export total of £300 million a year to Germany is possible. It could become a necessity to balance the success of German factory equipment, vehicles and consumer goods travelling in the opposite direction.

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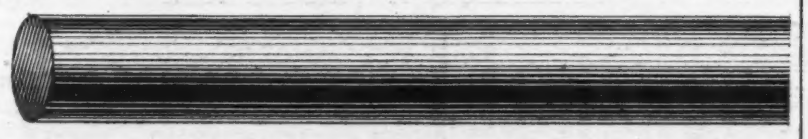

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CALDER HALL'S FIFTH ANNIVERSARY

Atom power progress

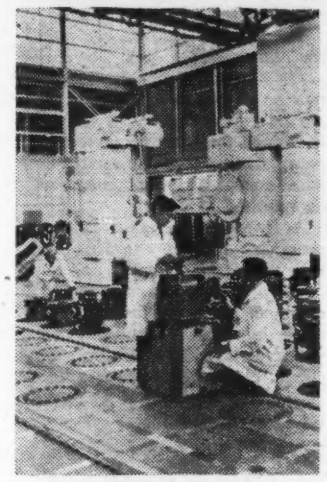
More reactors building on successful design

IT is five years since the Queen opened Calder Hall 'A' nuclear power station. There are now four reactors at this site, producing over 2,000 million units of electricity a year, most of this output being fed into the National Grid system.

There are already eight Calder Hall type reactors in operation—four at Calder Hall itself and four at Chapelcross in Dumfriesshire—and the design has proved so successful that more of these reactors are being built for the Central Electricity and the South of Scotland Electricity Boards.

It is planned to achieve 5,000 Megawatts of capacity by 1968 from 19 power stations, all of the Calder Hall design.

The original purpose of Calder Hall was to produce plutonium, with electricity as a profitable sideline.



Charge-discharge deck of No. 1 reactor. In the background can be seen: left, a lightly shielded charge machine, and right, a heavily shielded discharge machine used to remove highly radioactive fuel elements.

Each reactor was expected to have a heat output of 180 Megawatts but this has been increased to 225 Megawatts, partly by raising the operating temperature of the fuel elements from 408°C. to 418°C.

Another important factor has been the system for adjusting the loading to obtain a more even distribution of heat in the reactor core. This has been accomplished with the aid of electronic computers.

To take advantage of this increased output it has been necessary to reblade the turbines driving the electrical generators but excess steam is still being produced.

Next year it is planned to use some of this surplus for space heating at the nearby Windscale site, where there is a chemical extraction plant dealing with all the irradiated fuel produced by the eight Calder and Chapelcross reactors.

Calder type reactors are designed so that fuel can only be replaced when the reactor is shut down. This involves the removal of approximately 10,000 radioactive fuel elements and their replacement by new elements and takes place about once a year.

On January 31 this year the Calder Hall No. 4 reactor completed twelve months continuous operation, and during this period it was generating electricity at full load for 95.6 per cent of the time.

Of the missing 4.4 per cent, 2.5 per cent of the time was devoted to experimental work, 0.7 per cent to scheduled maintenance of ancillary equipment.

The average utilisation for all four reactors is now 85 per cent, including refuelling time.

Time saved

An important factor in achieving this high utilisation, in contrast to the figure of 75 per cent which was initially used as a basis for calculating nuclear power costs, has been a drastic cut in the time taken to refuel a reactor.

The first recharging operation carried out on Calder reactor No. 1 took eleven weeks; the same operation can now be performed in four weeks.

This significant improvement has been possible largely as the result of the care which has been taken in the organisation of the work, and in the planning of the maintenance carried out at the same time.

The recharging of the 10,000 fuel elements in each reactor represents a major handling problem, and the success of the methods and machinery developed has also made an important contribution to the high utilisation figures obtained.

The reactor core is built up of graphite bricks and measures approximately 36ft. across by 27ft. high.

It is contained within a steel pressure vessel as the carbon dioxide gas which circulates through the core and conveys heat from the fuel elements to the heat exchangers outside the reactor building is at a pressure of 100 lb/sq. in.

On top of the core is a layer of 6in. steel plates — the thermal shield—and above this is an 8ft. layer of concrete — the biological shield.

It is the top surface of this biological shield which forms the charge floor.

Running down from the charge floor are 106 charge tubes, each feeding a group of 16 fuel channels in the reactor core, each channel holding six fuel elements.

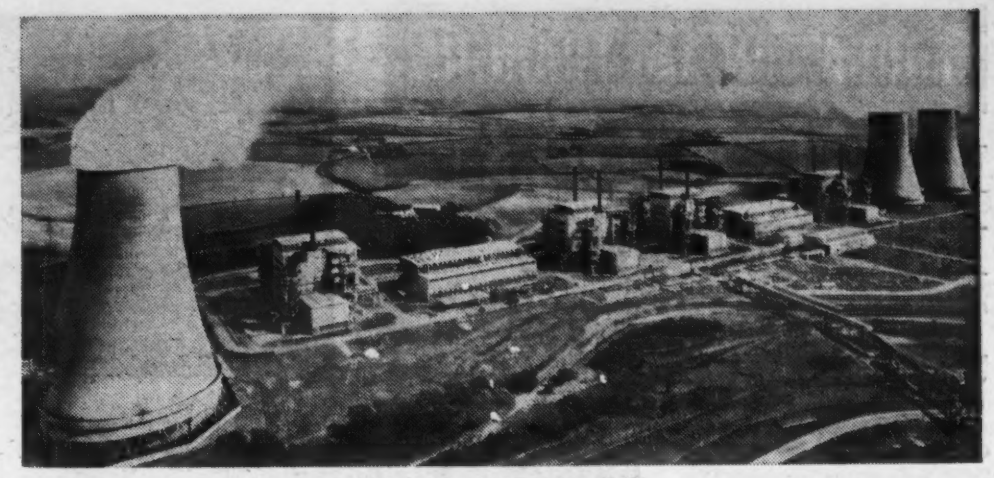
At the lower end of each charge tube is an adjustable chute, controlled from the charge floor, which allows each of the 16 channels to be fed in turn.

The fuel elements themselves are 40ins. long and weigh 28lb. apiece. Before loading they are quite safe to handle and consequently the charging machine, an electric hoist running on rails, does not require any shielding.

Picks up rods

The discharge machine, on the other hand, although performing a similar mechanical function—it picks up the irradiated fuel rods with a specially designed grab—has to be heavily shielded and weighs 60 tons as against 12 tons for the charging machine.

A considerable amount of experimental work has been undertaken on the Calder Hall reactors in connection with the civil power programme.



Aerial view of the Calder Hall site. Power stations A and B are both supplied with steam by two reactors, and each reactor has four heat exchangers (the lattice structures at the corners of the reactor buildings). Conventional cooling towers can be seen at each end of the site.

One important way in which the commercial nuclear power stations will differ from the Calder reactors is that fuel changing will be done on full power.

Fuel rods in channels adjacent to those in which fuel elements are being changed will thus be subject to changes in temperature, known as thermal cycling.

This has been simulated in the Calder reactors, and the fuel elements for the commercial reactors proved, by arranging for control rods to oscillate up and down over long periods.

One of the Sniffer Control Rooms. A sample of the gas flowing through each fuel channel is checked for contamination every 30 minutes. An automatic warning system is employed and in normal running this room would not be manned.

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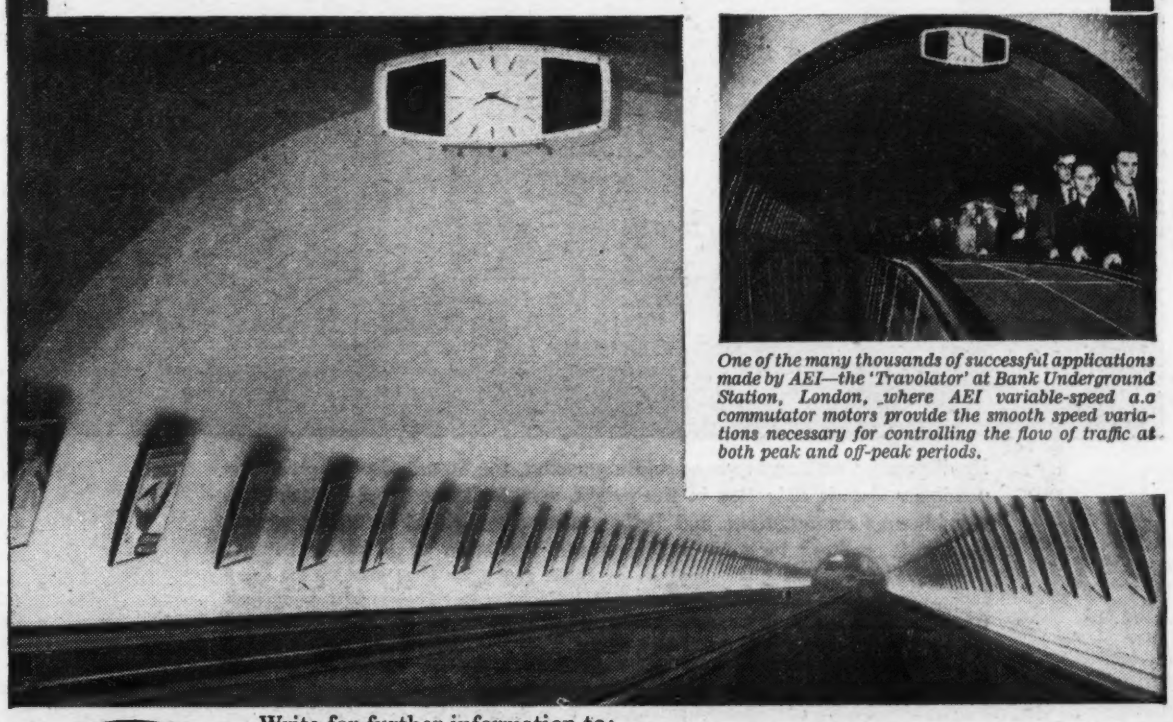

One of the many thousands of successful applications made by AEI—the 'Travolator' at Bank Underground Station, London, where AEI variable-speed a.c commutator motors provide the smooth speed variations necessary for controlling the flow of traffic at both peak and off-peak periods.

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EDUCATION and TRAINING

LEEDS BUILDS EXTENSION

THE Mechanical Engineering Department of Leeds University has just moved into a new building which is the second stage of a £1¼ million project. This will provide the University with one building for each of the three branches of engineering—civil, mechanical and electrical.

For the first time the University Grants Committee has made it possible for the complete building to be designed and built as an entity, because the plans for the three buildings have been approved on one extended project.

The engineering block is only part of a £17½ million scheme that the Government is planning to spend on the extensions to Leeds University by 1970. Included in the scheme will be a new medical school and Government infirmary, a new physics block and new libraries.

In terms of students the University is expanding at a rate rising from 4,500 in 1958 to 6,600 in 1965 and 7,200 in 1970.

Engineering gets its own Building

In the old mechanical engineering building the intake was between 50 and 60 students a year. The admission now is 90 a year and when fully in use 300 students, including research workers, will be housed in the new building.

It is expected that the ratio between the undergraduates and post-graduates ultimately will be about 10 to 1. For the coming session the ratio between art and technology students is about nine to seven.

The civil engineering department was opened last year; this was the first phase of the extension for the engineering block.

The mechanical engineering department will be followed by the electrical engineering department to open in 1963. The contractors of the complete building are F. Shepherd and Son Limited of York.

The character and appearance of the university area of Leeds is being completely transformed with the clearance of old terrace houses to make way for the new buildings.

The new mechanical engineering department of Leeds University flanked by the civil engineering department forms, with the electrical section still being built, the largest single university block to be sanctioned as one unit by the University Grants Committee.

The engineering building has barrel-vaulted roofs and Portland Stone facing for the façade rising through five floors.

The mechanical department completes the main spine block, and the general façade treatment continues with a central projecting block of lecture theatres.

There are two theatres at first and second floor levels protruding from the face of the building, and they are designed to hold 300 and 180 students respectively.

Emphasis

As in the previous section, the architects, Lanchester and Hall, have laid particular emphasis on the entrance hall, which extends through two floors of the building.

The inner hall is on the first floor, and also extends through two stories which, with its spacious landing, provides congregating space for those attending lectures. The laboratories and main heavy mechanical workshops are on the ground level, and drawing offices and staff rooms on the upper floors of the spine block.

The heat engines and fluid mechanics laboratories together form one space 150 ft. by 64 ft. and rise through two floors. At the upper level one side of the main corridor forms a continu viewing gallery overlooking collection of mechanical appara

The workshops are roofed w prestressed concrete beams s porting semi-circular glass pri lights, whilst those at the ends roofed with *in situ* shell constr tion.

The construction of the inter allows the corridor walls, ro partitions, etc., to be moved desired. The partitions are m of 4½ inch plastered brickwork

Ceiling panels

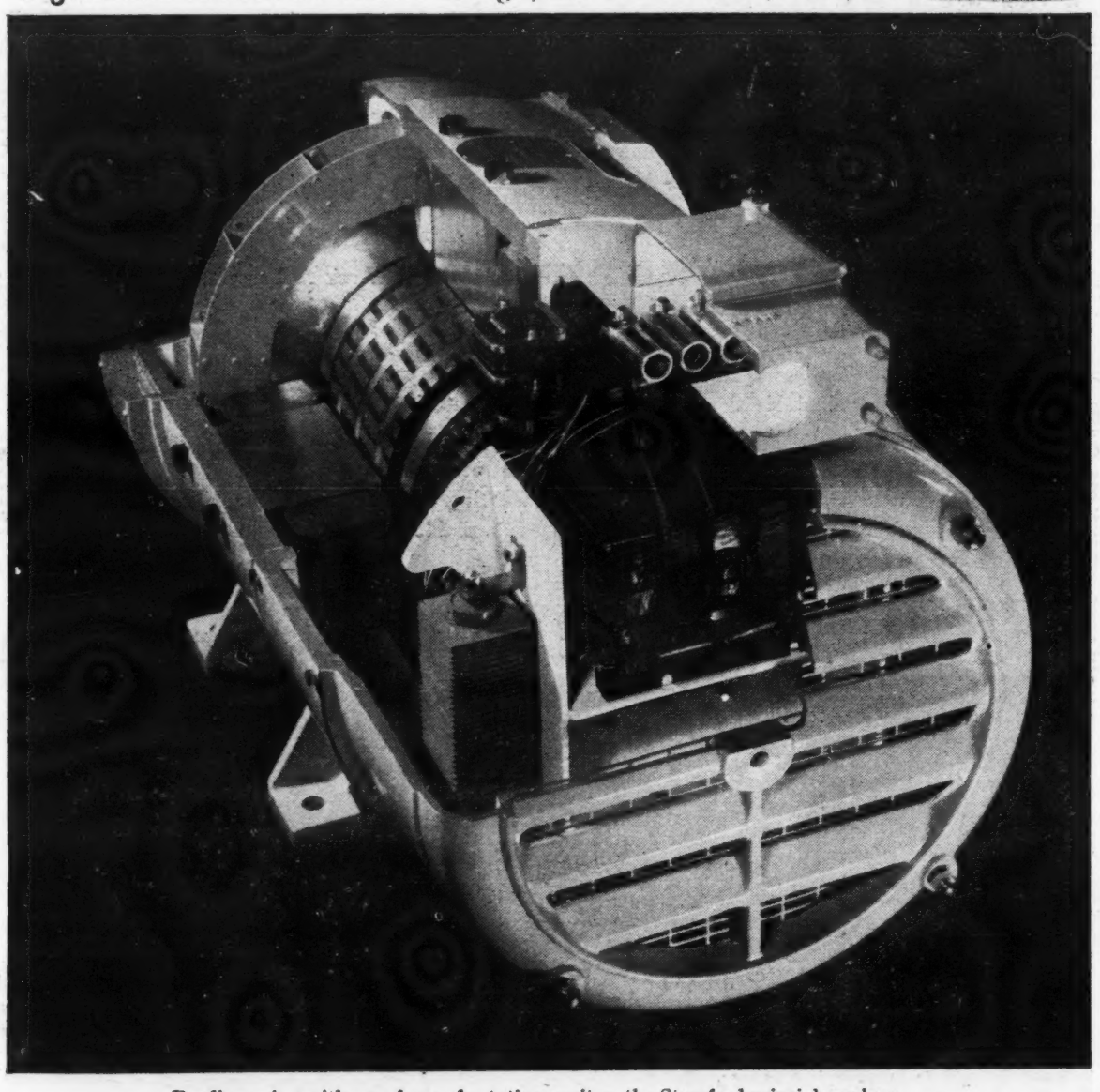
Heating is generally by means low-pressure hot water ceil panels, and there are some water heated metal suspen ceilings.

Artificial ventilation is restric to lecture theatres and ot special rooms. The lighting principally fluorescent, but entrance hall, lecture theatres corridors have tungsten fittings

The amount spent on equipm for the building will be ab £250,000, and a considerable p portion of this will be for exp mental equipment. It is inten to expand the quantity of resea being done at the University more complicated instruments be required.

At present the main fields research include investigati into the problems associated w vibrations and their effect machine parts; a study is be made into metal cutting; vari problems in combustion p cesses; elasto-hydrodynamic lu cation; and the study of heat tra fer in a shock wave.

a germinal idea in alternator design, the STAMFORD principle STAMFORD



By dispensing with any form of rotating exciter, the Stamford principle makes possible a drastic reduction in the weight, complexity and cost of each unit. Troublesome commutators, and D.C. brushes are replaced by static control gear with resultant long life and improved regulation at all power factors. Five types of Stamford Alternators* are available, giving the ideal machine for every application. Outputs range from 500W to 300 kVA. For accurate voltage regulation and high transient overload capacity for motor-starting duty, rapid recovery on change of load and regular wave form, specify Stamford Alternators. • STAMFORD MARINE RANGE • STAMFORD E.S. • STAMFORD STANDARD • STAMFORD NEWPHASE • STAMFORD L RANGE

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Firm opens school in Sheffield

A NEW apprentice training school of Thomas Firth and John Brown Limited at Sheffield was officially opened recently by Mr. W. J. Carron, president of the Amalgamated Engineering Union.

The School contains a large workshop with facilities for training 54 apprentice fitters and electricians in the basic skills of their trade, together with a comprehensive range of modern machine tools for apprentice turners. There is also a large lecture theatre fitted out with visual aid equipment.

The first training school was opened in 1945 and intermittently extended, but two years ago it was decided to build the new school. With the growing importance of training schemes it is already questioned whether the new building is sufficiently large.

The apprentices will remain in the school for eighteen months two years. During the first months they will be shown fitti machine operation and electri instruction.

At the end of this period decision is made on the best tr for the candidate to follow. T remainder of the course will t the apprentice through basic pects of his particular trade, later he will transfer to the gineering departments, product machine shops or drawing offi for further training.

The apprentices will also attending the local Techni College for one day a week, the majority will sit for the C and Guild examinations, w the remainder will be on Natio Certificate courses. The comp have several other train schemes, and the total number trainees including graduates 400 out of 5,500 employees.

'ABILITY IS GAINING ITS JUST REWARD'

MANAGEMENT by birth is no longer good enough for British industry said Mr. Harold Burke, president of The Institution of Production Engineers, and deputy chairman and joint managing director of Concentric, Ltd., speaking at a meeting of the Institution in London this week.

Mr. Burke said that the practice of filling managerial positions with relatives of "the Boss" was becoming a thing of the past.

High standards

World wide competition demanded the highest standards of education and training for anyone who aspired to a managerial position. There was a crying need for tremendous expansion of educational facilities for production engineering.

The government made incessant demands for increased national production, which could only be met by a substantial increase in the number of qualified production engineers throughout manufac ing industry.

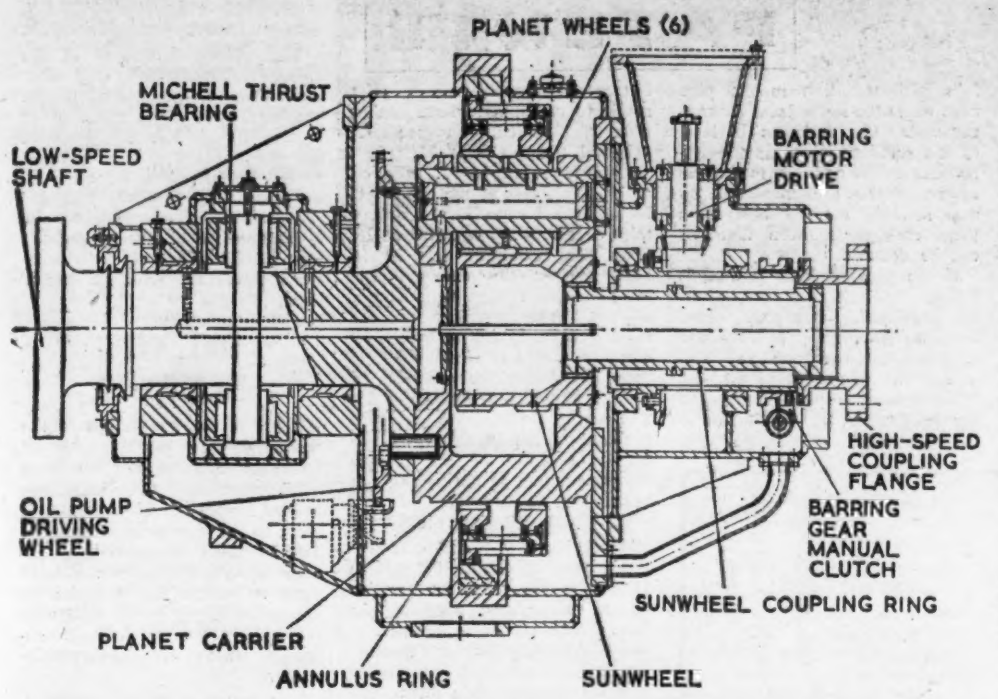
There is ample evidence, Burke stated, that the governm does not really understand Bri industry. Many of their p nouncements indicate a lack appreciation of some of mana ment's most urgent day-to- problems.

There is no one in the prese government who can speak wi real authority on manufacturi affairs, he said.

In spite of the lack encouragement from high office is the duty of each and ev one of the 13,000 members The Institution of Product Engineers to make his c personal contribution towar achieving the immediate incre of not less than 3 per cent. national production which economists claim is necessary.

Mr. Burke was addressing meeting of the institution calle discuss plans for a nation-w campaign to improve product efficiency.

GEARS TO CONVERT LIBERTY SHIPS



Britain exports epicyclic units to France

THE largest Allen-Stoeckicht epicyclic gears, said to be as big as any yet made for marine propulsion, have been built by W. H. Allen Sons and Co., Ltd., of Bedford, for export to France.

Two units are being supplied. Each will be used to convert a ship from steam to diesel propulsion, and will transmit 4,200 h.p. continuously with a speed reduction of 418/128 r.p.m.

The gears have been designed for long-life, to the requirements of Bureau Veritas.

Gears of this type would be offered for steam or gas turbine propulsion and are suitable for use at much higher speeds, and corresponding increases in transmitted horse power.

Each unit measures 8ft. 10 7/8in. over input and output coupling flanges, and is approximately 6ft. diameter. Total weight of both units is 10 tons.

Fluid coupling

A fluid coupling is mounted between engine and gear box. The sunwheel is connected to the fluid coupling by a double-toothed flexible coupling and drives six planet wheels.

The annulus system is flexibly coupled to the gearcase, and drive is transmitted through the planet wheels to the rotating carrier, bolted to the output shaft.

A solid, forged collar on the output shaft, transmits a propeller thrust of 50 tons to a Michell thrust bearing.

At the input end, a small geared motor is used with straight bevel gears and manually operated dog clutch for barring.

Generators for Mexico

MEXICO'S Federal Electricity Commission has placed a £330,000 order for diesel-alternator sets with the Diesel Engine Division of the English Electric Co., Rugby.

The equipment to be supplied consists of ten self-contained mobile generating stations, which are to operate in temperatures varying between 77° and 113° F and at altitudes between sea level and 7,229ft. They will be used as local sources of power.

Some of the engines may be arranged to run as dual-feed units, using natural gas.

Turbine explosion cost £1m.

COST of reconstructing the 30-megawatt turbine which exploded at Bold, Lancs., Power Station last November, cutting off the electricity supply to thousands of homes and factories over a wide area, is estimated at more than £1 million.

Work on the project is well up to schedule, and it is expected that the turbine, one of four which feeds current from the power station directly into local supplies, will be recommissioned by the end of the year.

The remaining three turbo-generators have been working at full capacity to avoid further interruption of supplies while the reconstruction has been carried out.

The full findings of a technical investigation into the causes of the explosion have not yet been published.

MACHINE AIDS CASTING

SWISS firm Vektor A.G. have designed a machine for removing sand from the top of mould boxes. It increases output and takes some of the hard work out of foundry production.

Their suppliers in the U.K., Ernest Fairbairn Ltd., 376 Strand, London, say this sandcutting machine can be built to customers' requirements.

It is said to be particularly useful when moulds have been filled with a sandslinging machine where the densely packed sand makes levelling-off particularly difficult, as for large castings and moulds.

The rotating spiral cutter is adjustable for height by manually setting a feeler to touch the mould top as it enters the machine.

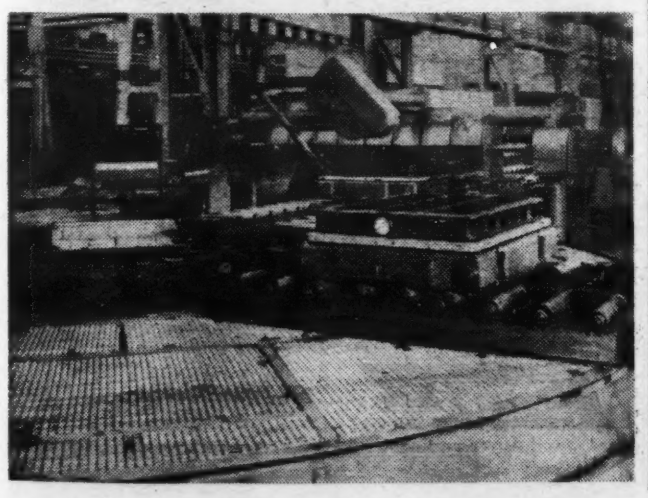
Hydraulic control

This controls the lifting columns by hydraulic means and the cylinders are automatically synchronised to give a uniform lifting action to each end of the cutter to keep it level.

In foundries using natural-sand machine-slung into the moulds, the sand is heavily compressed and has to be loosened first with pneumatic devices before it can be levelled off.

The control desk has automatic as well as manual control and the machine can be made to lower itself automatically for each mould box as it approaches the machine on the conveyor.

A new sand-cutting machine from Switzerland—this machine eliminates the slow and laborious work of removing moulding sand from the top of boxes after they have been rammed by a sandslinger.



Cell gives two-year air supply in space

AN electrolyte cell that operates under weightless conditions may provide a vital link in a chemical system that will convert an astronaut's breath into oxygen during space voyages lasting two years.

A prototype developed by the Battelle Memorial Institute will soon be ready for testing.

The cell, which breaks down water into oxygen and hydrogen, creates its own gravity field by the centrifugal force produced as the cell rotates. This allows the normal gravitational separation of gas bubbles in the electrolytic solution.

*

A new device is also used which converts the carbon dioxide in an astronaut's breath into carbon and water.

The device will use the hydrogen produced by the cell, which, in turn, will use the water to provide more oxygen.

The unit is drum-shaped about 3-ft. high and rotates at up to 500 r.p.m. Inside are 16 cells stacked like pancakes. Alternate metal plates serve as anodes and cathodes. Between these are asbestos diaphrams which separate the hydrogen and oxygen generated on the electrodes.

A 500-watt input will electrolyse about two quarts of water a day, sufficient to supply two men.

*

Launching of the National Aeronautics Space Administrations' first synchronous communications satellite is expected to take place in late 1962.

Scientists at Hughes Aircraft Company have designed a small satellite which is stabilised by spinning, like a gyroscope, and it will transmit a signal beam in the shape of a pancake with the edge towards the earth.

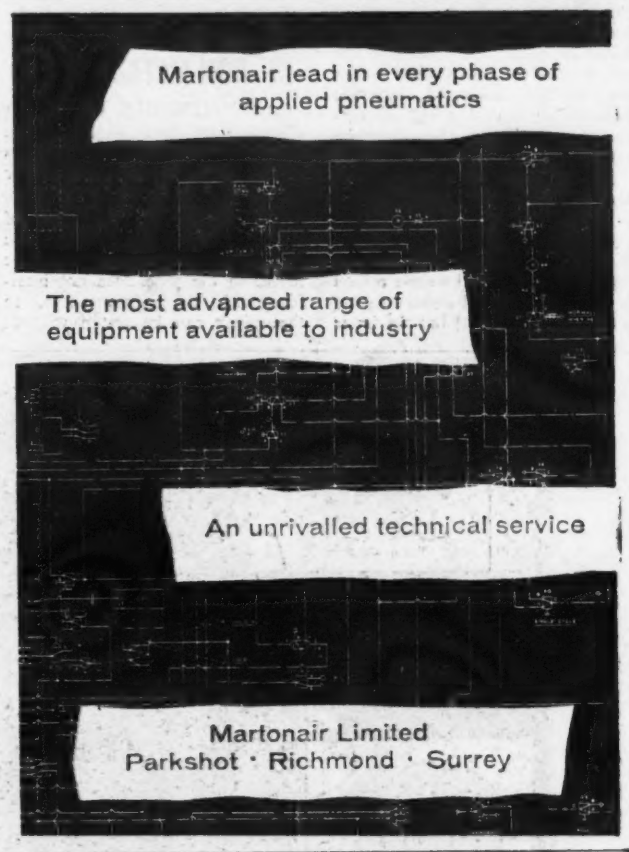
Syncom, as it is called, will be the first spacecraft to be placed in a synchronous orbit, i.e. one in which the orbital velocity is matched to the earth's rotation so that the satellite will appear to hover over a given area.

BITA PRIZE IS VISIT TO U.S.

FOR the fourth successive year the British Industrial Truck Association has decided that the winner of the John Morris Memorial Award will attend the annual material handling training course at Lake Placid, U.S.A.

The winner will be selected from a competition to be held shortly. It is open to all who are responsible for moving, handling, stocking and controlling materials.

Particulars may be obtained from the British Industrial Truck Association, York Mansion, 94/98 Petty France, London, S.W.1.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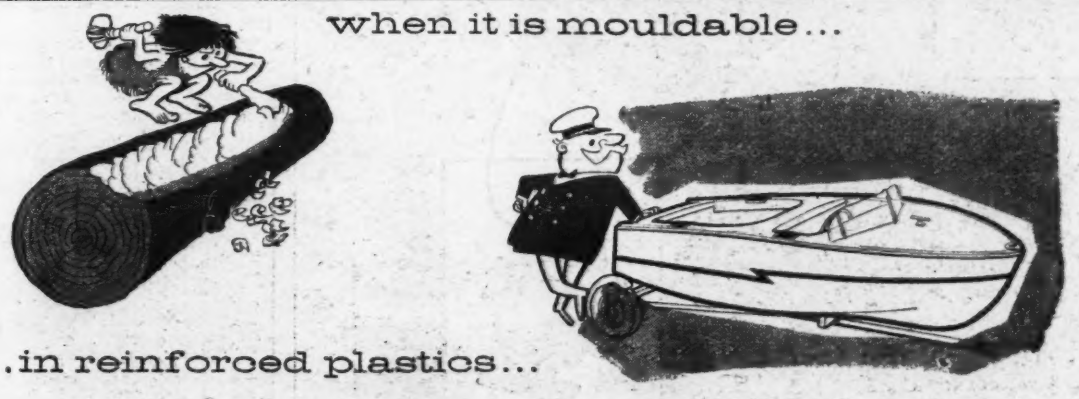

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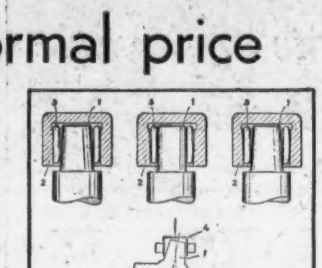
Long-life universal joint for the normal price

SUBSTANTIALLY greater working life of the needle bearings of a Cardan-type universal joint, without significantly increasing the manufacturing cost, is the object of **Patent No. 878,997 taken out by Kurt Schroter and Bernhard Walterscheid-Muller of Lohmar/Rheinland, Germany.**

The torque-transmitting univeral joint under consideration is of the type where two forks angularly displaced by 90 are interconnected by a spider whose fulcrum pins are journalled in bushings in the fork arms by means of needle-type roller bearing. In earlier joints of this type it has been found that when the bearings are highly stressed under load, a transverse displacement occurs between the axles of diametrically opposed fork bearing bushings owing to the elastic deformation of the fork arms. This results in asymmetrical loading on the bearing needle, which concentrates the stresses at their ends.

Patent No. 878,997 aims to overcome this disadvantage by providing that the generators of the inner and outer bearing surfaces of each roller bearing are not parallel to one another when the joint is unloaded, but are inclined so that the bearing surfaces diverge in the direction away from the centre of the joint.

In the illustrated version, which shows one needle bearing of the joint, the fulcrum pin 1 of the spider is journalled in a bushing 2 in one of the joint forks by means of cylindrical needle rollers 3. In this case, the outer bearing surface is cylindrical but the inner



PATENT No. 878,997

bearing surface of the fulcrum pin 1 is of frusto-conical form, giving a slight taper away from the centre of the joint.

When the joint is subject to full load torque, the two arms of the fork will be deformed in directions generally transverse to the axes of their bearing bushings, causing these axes to be laterally displaced as indicated in the illustration. However, provided the degree of taper of the fulcrum pins is correctly chosen, the inner and outer bearing surfaces will come into parallelism in the zone of load transmission.

MEASURING VARIATIONS IN NON-METAL PIPES

A CONTINUOUS method for gauging bore variations in rigid or flexible non-metallic pipes is described in the **Dunlop Rubber Co.'s Patent No. 878,488.**

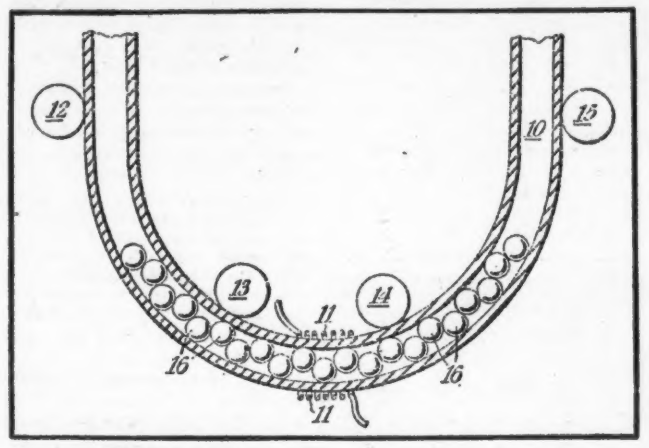
The method is independent of the external diameter and has the advantage that any non-metallic liquid in the pipe does not interfere with the measurement, so that pipes can be tested without the need for emptying and drying the bore.

The system consists of fitting a length of the pipe with liquid metal or, preferably, small metal spheres or shot which can move sufficiently freely to pack the pipe section under test. The pipe is passed through a wire coil and the change in impedance of the coil during the passage is measured.

In the case of rigid pipes, the pipe is placed vertically between the pole pieces of a magnet and a steel ball of slightly less diameter than the pipe is dropped into the bore and held in position by the magnetic field.

A number of small non-magnetic metal balls are placed in the bore to pack it to the middle of a wire coil placed 2 or 3 cm above the magnet, and through which the pipe passes.

The small balls are held in position by the large steel ball, although the pipe can be freely moved.



PATENT No. 878,488

As the pipe is passed through the poles of the magnet, the upper level of the small balls rises and falls with variation in the pipe bore while the lower level remains constant. The variation in level of the small balls affects the impedance of the coil. These changes in impedance are measured by any suitable method and from them changes in bore diameter can be deduced.

If the pipe to be measured is flexible, a different technique can be employed. One end of a flexible pipe is first passed through a stationary wire coil 11 and guided by rollers 12, 13 and 14, which deflect the pipe into an arc, the lowest part of which lies in the wire coil.

Sufficient liquid metal or steel shot is inserted in the bore to pack the arc to a short distance beyond the coil on either side. The wire coil 11 is fed with power at its resonant frequency and the pipe 10 is drawn through the coil.

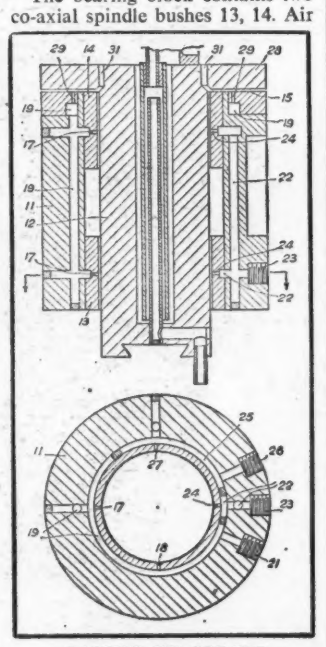
As the pipe progresses, the liquid metal on the steel balls 16 remain in the arc, and any variations in diameter cause variation in the amount of metal in the coil, affecting its impedance.

AIR-BEARINGS FOR LOW SPEED SPINDLES

A PRECISION gaseous fluid bearing to support a low-speed vertical spindle, described in **Patent No. 877,555, registered by the National Research Development Corporation,** maintains the position of the spindle axis constant to within 5 micro-inches; the spindle being ground to normal limits of accuracy and located within a honed bore.

In a typical application (in fact a roundness measuring machine, which is itself one of the objects covered by the Patent), a spindle 12 is mounted in a bearing block 11.

The bearing block contains two co-axial spindle bushes 13, 14. Air



PATENT NO. 877,555

is admitted to the annular space between each bush and the spindle by four jets mutually at right angles.

Two adjacent jets 17, 18 in both bushes are supplied from an inlet manifold common to both bushes with air at constant pressure, supplied through inlet 21.

Another manifold 22, supplied at 23, feeds one of the other jets 24 in both bushes 13, 14, and a third manifold 25, supplied at 26, feeds the remaining jets 27 in both bushes; the corresponding jets in the two bushes being axially aligned. The supplies to the manifolds 22, 25 are controlled by separate precision regulators.

By regulating the pressure of the air supplied to manifolds 22, 25, while maintaining constant pressure in the manifold 19, the precise position of the spindle axis in relation to the axis of the bushes can be adjusted.

To locate the shaft longitudinally, the block 11 has a transverse thrust face 15 while the spindle 12 has a transverse face on an integral flange 28 opposite the face 15. Fluid under pressure is supplied from manifold 19 through a number of jets 29 into the space between the transverse faces. Passages 31 permit the escape of air through the flange 28.

MAGNETIC CORE LAMINATIONS

IN magnetic cores for transformers, chokes, etc., of the type comprising three limbs with yokes across each end, it is possible to build up the laminations from E and I sections, from T and U sections, from F sections

PATENT No. 878,573

or from two foreshortened E sections. All these fabrication methods, however, lead to wastage of much of the material. **The General Electric Co. Ltd. (Patent No. 878,573)** have discovered that, by a combination of one T, and two L portions cut from a rectangular shape of core material of the same width as the T portion, substantially all wastage can b avoided during fabrication.

Fig. 1 depicts the layout c core laminations and Fig. 2 th method of cutting the T and sections from a rectangular shee

The widths *ab* and *ef* of th side limbs are equal to each oth and also to the width of th windows. Also *ab* is equal to c and *ef* to *gd*. The height *ax* c the top of the T portion is equ to the heights *gh* and footmark in marks *(g'h')* *(g"h")* and *g* Alternatively, an asymmetric T portion can be cut so that th sum of the widths of the L po tions equals the width of the stem.

FUEL CELL ELECTRODES

ONE of the restrictions to th current-carrying capacity c a fuel cell, and a source of voltag inefficiency, is the activatio energy for the reactions that tak place at the electrodes of the ce **The National Research Develo ment Corp's. Patent No. 877,4** aims to reduce the loss due activation energy at the electrod by making use of electrode m terials which are non-stoichi metric.

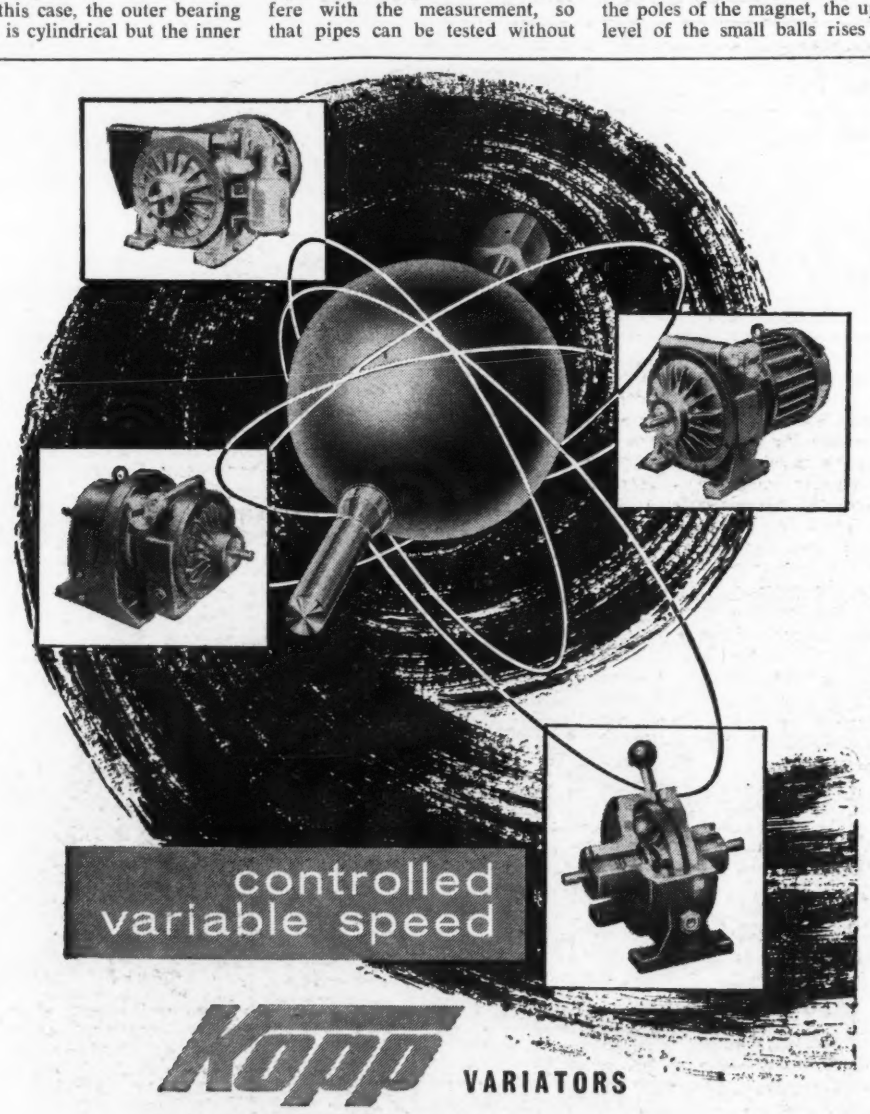
In the case of the fuel electrod the surface portion in contact wi the electrolyte is one having a excess of its electro-negative co stituent; for instance, the electro might be a porous mass sintere from nickel powder, with a firm adherent layer of black nick oxide applied through the poro mass.

For the other electrode — t oxygen or halogen electrode—t surface in contact with the electr lyte is non-stoichiometric materi having an excess of electro-positi constituent — for example, zi oxide and cadmium oxide. improve conductivity it is adv able to silverise the zinc cadmium oxide particle.

Alternatively thoria and ce are suitable as oxygen accepto for the oxygen electrode.

A nickel oxide electrode and zinc oxide electrode may be su ably separated by an electroly of magnesium oxides dissolved fluorides. In a water gas/air c for example, if air is supplied the oxygen electrode the oxyg content is absorbed into the zi oxide with minimum expenditu of activation energy.

Ionised oxygen is transport in the electrolyte toward the fu electrode. The hydrogen and c bonaceous gases in the water g are absorbed into the nickel oxi electrode and metal ion migra in the electrolyte towards t oxygen electrode.



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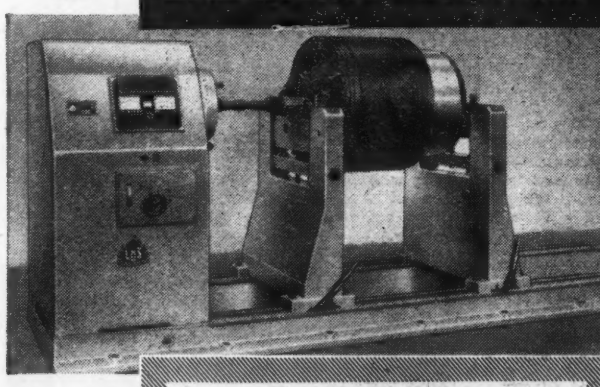

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. . . METROLOGY . . . METROLOGY . . . METROLOGY . . . METROLOGY . . . METROLOGY . . .

THE QUIET REVOLUTION

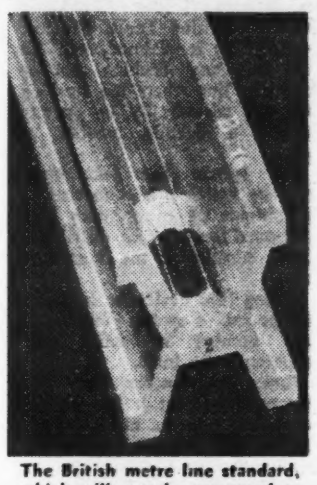
Metre defined in wavelengths

A TECHNICAL revolution took place about a year ago—a revolution which made a few middle-page headlines in the national Press and a little more in certain technical journals, but that is all. Nevertheless, decision made in Paris at that time will have far-reaching effects on science, technology, and industry throughout the world.

It was publicly announced on October 16, 1960 that the eleventh general conference of Weights and Measures had decided that the metre should be redefined as 1650 763.73 wavelengths in vacuum of the orange-red radiation of krypton isotope 86.

Thus was brought to fruition an idea, over 130 years old, of French philosopher Jacques Babinet that wavelengths of light could be used as a natural standard of length in place of material length bars.

In 1893, Michelson and Benoit made the first actual determination of the metre in terms of the red radiation of cadmium. Ex-



The British metre line standard, which will now be preserved as an object of historical interest.

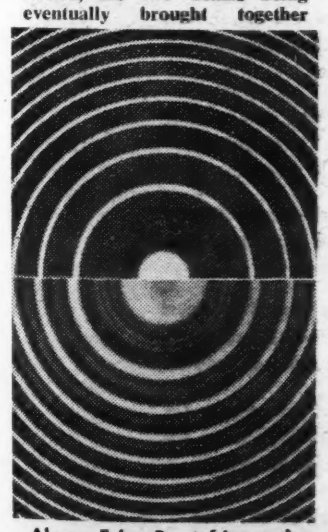
perimental and development work has gone on ever since in France, England, Germany, Japan, and later in Russia.

All this work has been directed towards the establishment of a wavelength standard, but it was not until the production of isotopes of various elements, made possible by nuclear physics, that there appeared to be sufficient advance in accuracy over existing methods of standardisation to warrant a change.

The accuracy obtainable depends largely on the degree to which the radiation used is truly monochromatic.

Natural elements, composed of various isotopes each producing a slightly different wavelength, give a bandwidth which limits accuracy.

The instruments used for this type of work are known as interferometers. They make use of beams of light, passing through a system of glass or quartz plates, which are partially transmitted and partially reflected, the two beams being eventually brought together again, and viewed through an optical system.



Above: Fabry-Perot fringes obtained with light from mercury isotope 198; below: the less clear results obtained with natural mercury light.

The relative phase of the two beams when they meet will depend on the difference in length of the paths they have travelled; if the path difference is made to change gradually, for example by the movement of one of the parallel plate elements, the cycle of phase change can be observed by the movement of dark and bright interference bands or fringes and the movement of the element can be determined with high accuracy in terms of the wavelength.

LEGALLY, Britain and the Commonwealth have not yet gone over to a wavelength standard due to the delay in getting the weights and measures bill through Parliament.

This bill will contain a clause defining the Imperial Standard Yard as 0.9144 metre, thus automatically linking it to the new metre wavelength standard.

The present yard standard, dating from 1855, is a bronze bar of 1in. square section in which are sunk, 36in. apart, two "wells" half way through the bar. Fine lines are ruled on small gold plugs fitted to the bottoms of the wells and the distance between the centre line of each group defines the standard; it is therefore known as a "line standard".

The metre bar standard, which will now be preserved for historical interest, is also a line standard but has a continuous section, the lines being ruled on a narrow flat strip at the root of the upper vee of the X.

The reason for going to this trouble to position the lines within the body of each bar is to ensure that they lie in the neutral plane so that the standard distance is not affected by any bending of the bar, slight though this may be.

REPLACED

In 1889, the metre bar, of a platinum-iridium alloy, replaced the former standard which was a platinum "end bar"; that is to say, its length was defined as the distance between its end faces.

The metre line standard, the "International Prototype Metre", has proved to be remarkably stable in its length in various comparisons with wavelengths since 1893, but the Imperial Standard Yard bar has been decreasing in length by about one millionth of an inch per annum over the same period.

Thus, between 1895 and 1947, the conversion value of the inch has changed from 25.399 978 mm to 25.399 931 mm.

In 1866 the U.S. defined its yard standard in terms of the metre in the exact ratio 3600/3937, making the American inch 25.400 051 mm.

In 1946, the Royal Society Empire Scientific Conference proposed that a new international yard should be defined as 0.9144 metre, making the inch exactly 25.4 mm.

This has been agreed by all the inch-using countries and has been in practical use for some years, in anticipation of legal redefinitions, in the calibration of scientific and industrial standards, such as slip gauges and end bars.

TO most people, including many engineers, this great concern for accuracies of a few parts in several million seems unnecessarily pedantic but the following example of everyday engineering standardisation will show that this is not so.

A common enough tolerance on an engineering component, say a shaft, would be 0.001in. In production, the gauges used for control of this dimension will be made to a tolerance of about one tenth of this figure, 0.0001in.

In the works gauge inspection department or standards room, the slip gauges used for routine gauge inspection must therefore be calibrated, probably several times a year, to an accuracy of 0.000 01in.

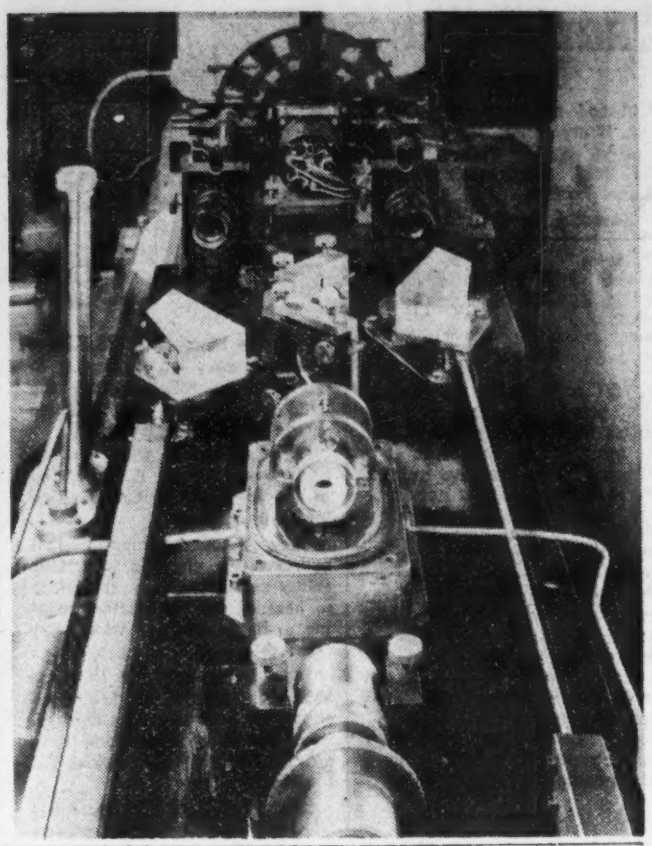
by
K. J. HUME, B.Sc., M.I.Mech.E.
Who trained as a hybrid physicist engineer at the NPL and entered production engineering in 1938 as Metrology Superintendent in The de Havilland Aircraft Company. In 1959, he was appointed Reader in Engineering Production at Loughborough College of Technology.

It therefore follows that slip gauges used for reference, both in industry and standardising laboratories, must be calibrated to an accuracy of one part in a million.

GOOD POSITION

This is quite a good position to be in but it is unlikely to be held for long if demands for everyday accuracy continue to increase as they have done over the last fifty years.

The new permanent link between yard and metre standards inevitably raises the question of a complete transfer to the metric system but this is quite a different and much wider issue.



A two-channel photoelectric recording interferometer for precise comparisons of wavelengths. Photographs by the National Physical Laboratory.

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ENGINEERING NEWS

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Thursday, October 19, 1961

The noise race

NOT only oysters but human beings are annoyed by noises. While oysters are said to be upset by noisy noises, it is surprising how sensitive humans are to extremely quiet noises.

A house lighting meter or a nearby power transformer can hum the occupant of a quiet house into a state of nervous exhaustion and technically the suppression of these very quiet noises is often more difficult than dealing with large engines.

Since the war, noise from aircraft, particularly jets, has steadily become more irritating. Higher speeds demand higher engine power and usually this is accompanied by more noise.

★

However, engineers in this country and the U.S. have been so successful in reducing noise that jets now in service are no worse than most heavy piston engines.

Important British efforts are the new by-pass and turbofan engines which have relatively low jet efflux velocities and are therefore quieter than straight jets.

Typical of these new engines is the Bristol Siddeley BS. 75 turbofan, which is claimed to give 25 per cent increase in take-off thrust and 50 per cent reduction in noise.

This engine is intended to power the British Aircraft Corporation's 107 which is the high-speed successor to short/medium range aircraft such as the Viscount and Convair 440.

★

Rolls-Royce are also developing quieter fan jet engines and aircraft designers are working on jet airliners which climb away rapidly from built-up areas.

All this sounds encouraging, but with a supersonic airliner likely within the next ten years, a much greater effort for development of quiet engines will be needed.

Increasing speeds of travel and mechanisation of home and factory, are contributing to a steady rise in noise level; engineers must pay more attention to these matters if they are not to be branded as destroyers of the peace.

Tomorrow's technology

SUPERCONDUCTIVITY, at present the realm of the physicist, may soon be the basis for a number of practical devices. Research at the Battelle Memorial Institute, Ohio, has shown that applications such as frictionless bearings, super powerful magnets, and special switches are likely to be exploited.

At very low temperatures the electrical resistance of conductors disappears and it is possible to float parts made of superconducting material in a magnetic field —an effect that could lead to frictionless bearings.

Superconductivity can also be used for producing an 88 kilogauss magnetic field strength under steady conditions and as high as 180 kilogauss under pulsed conditions.

an Engineer's DIARY

Theory, theory, theory —let's be practical

AT the Harrogate B.I.S.R.A. conference on hydrogen in steel I was reflecting on the balance of theory and practice in the discourses given.

Drinking coffee with Mr. C. Elliot and Mr. R. E. Sherwood of the Edgar Allen Co., I asked for their opinions.

They made the point that hydrogen in steel is a serious matter and they were most anxious to hear of any information relating to its removal; so were many other delegates.

Instead, two-thirds of the time had been devoted to learned papers on how it causes damage. Even the open discussions were mostly dissections of theories put forward.

It is appreciated that specialists who spend much time on analysing and unearthing basic knowledge will be disposed to air their efforts at length, but they must also realise that practical aspects of their work are the ones which solve the problems in the factory.

The emphasis on the theoretical seems to be a weakness at many important conferences.

Expert Italians

FOR fifty visiting Italians, led by Dr. Pisani Ceretti, secretary of the Italian Association of Knitwear Manufacturers, there was a special glee in touring the International Knitting Machinery exhibition at Belle Vue, Manchester on Friday.

Dr. Clements Boniver, commercial counsellor to the Italian embassy in London, told me that the delegation would aim at buying machines that would keep down unit costs while stepping up production.

The questions the delegation were putting indicated that the Italians believe that the only man to send abroad is the man who knows the subject inside out.

Official Italian delegates outnumbered exhibiting firms from their own country by roughly two to one.

But it was one of their own concerns, the Billi company of Milan, that was causing so much delight. Their Zodiac four-feed machine performing 480,000 stitches a minute had gathered in 200 options on itself in the first three days of the exhibition.

Indian friendship

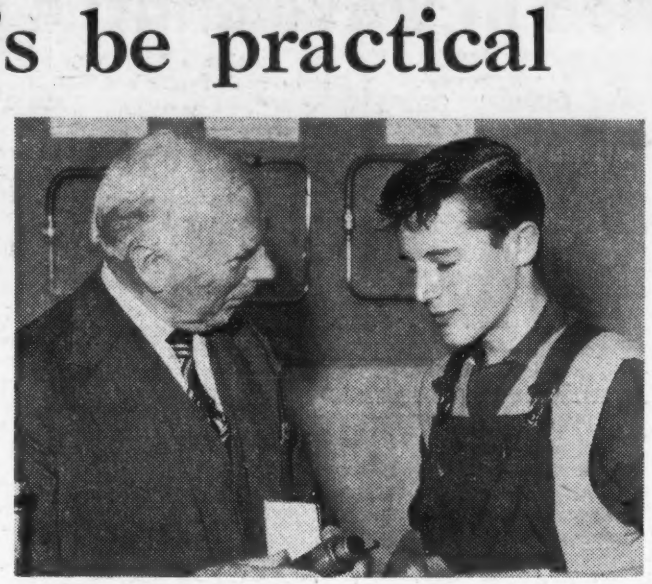
IN the middle of all the Common Market or Commonwealth uproar I find that one piece of scenery that manages to stay in the same place is the co-operative effort that some members of the Commonwealth and British industry have made in education.

To No. 21 Tothill Street, almost as significant a number as No. 10, came recently Mr. R. N. Dogra, principal of the Delhi College of Engineering and Technology, towards whose equipment UK industry has paid more than £250,000.

Mr. Dogra had come to the headquarters of the Federation of British Industries to meet Mr. P. F. D. Tennant, overseas director of the F.B.I. and other representatives of industry.

At this college, the first group of 150 students are equally spread over civil, mechanical, electrical and chemical engineering and textile technology.

Mr. Dogra told the FBI: "I can only repeat the words of Profesor Humayun Kabir, Indian Minister for Scientific Research and Cultural Affairs, when he opened the college in August.



THE South Eastern Gas Board has built a fine area training centre on the site of a former gas works in the Old Kent Road, London, S.E.

More than 4,000 apprentices, foremen, and commercial staff will pass through the workshops and classrooms each year.

Sir Thomas Bennett, architect of the centre is seen above with one of the gas industry's new recruits at last week's official opening.

"He said the college was a visible symbol of the friendship between the peoples of India and Britain, and it was the outcome of the collective efforts of scientists, industrialists, businessmen, politicians, and friends of India in Britain."

The U.K. Government is providing fifteen professors and certain additional services for the next five years.

Overtime overpay

IN the US it is "Moonlighting," and it may get the bell-hop a holiday in Miami. In Britain it is more prosaically known as Paying-off-the-car.

Whatever its title, working in the evenings or at the week-end on jobs over and above the regular weekly effort is as unpopular with most employers as it is, presumably, condoned by those who benefit.

In a varied pattern of schoolteachers serving in bars and barmen teaching in dancing schools, there is usually one common characteristic—keeping it quiet.

Now this has been breached by an advertisement in a Lincolnshire newspaper appealing for building workers, even a foreman, for week-end work until Christmas.

Writing in protest, the director of the Midland Federation of Building Trades Employers points out that the advertisement offered rates of pay above normal and added a bonus and free transport.

The complaint that this style of organised spare time work was unfair to the established employer of building labour, with his contributions for pensions, National Health, holidays and so on, applies more widely.

The man who has been slogging away for a bonus at the week-end is not the most refreshed of people when it comes to starting again on Monday.

Hay in tins?

GIVEN a strong imagination or an exceptionally long memory it is still just possible to be stirred by the mechanical process of haymaking in the countryside.

But not, it seems for much longer. Massey-Ferguson, who now seem as all-pervasive in agriculture as grass or cows, have taken up the world manufacturing and marketing rights to a haymaking invention.

The machine, compressing hay into small dense wafers, apparently ushers in a radically new approach to haymaking. Doing it this way, says Mr. Albert Thornborough, president of M-F, the hay can be cut, cured, packaged, loaded, stored and fed, entirely by mechanical means.

With farmworkers drifting from the farms in most industrialised lands, the savings in labour and production costs should be worth while.

SOVIET ENGINEERING

by our own correspondent

Kirov factory controls honing by hydro-system

AN interesting system for active control in honing is reported from the Kirov Factory, Odessa.

A ring with nozzles is installed above the work-piece in such a way that the nozzles are located uniformly around the circumference; the number of nozzles being equal to the number of bars.

The internal diameter of the ring is 0.1—0.2 mm greater than the diameter of the hole being honed.

A coolant under pressure is fed to the system; part of the coolant passes through a valve to the cavity of the ring and proceeds across the nozzle to the overflow, the rest passes over constant resistances.

With the reciprocating and rotatory motions of the hone the abrasive bars periodically cover the nozzles in cross running. The pressure in the ring cavity in cross running conditions depends upon the gap between the ring and the bars, i.e. upon the size of the hole being honed.

★

As the material is removed the diameter of the instrument increases, the distance between the bars and the nozzles is reduced and the pressure in the cavity of the ring is raised.

A sensing unit balances the variable pressure with a constant counter pressure between the above-mentioned resistances.

When the prescribed size and adjustment of the valve is reached the pressure in both centres of the sensing unit is balanced and the honing process automatically stops.

This hydro-scheme operates o the same general laws as pneu matic measuring systems.

It is claimed that the ne scheme is more suitable fo measuring small diameters and simpler for fitting to honin machines than existing activ control methods.

Further advantages of th system are that there are no par to wear out and the coolant— kerosene—is used as the workin medium.

★

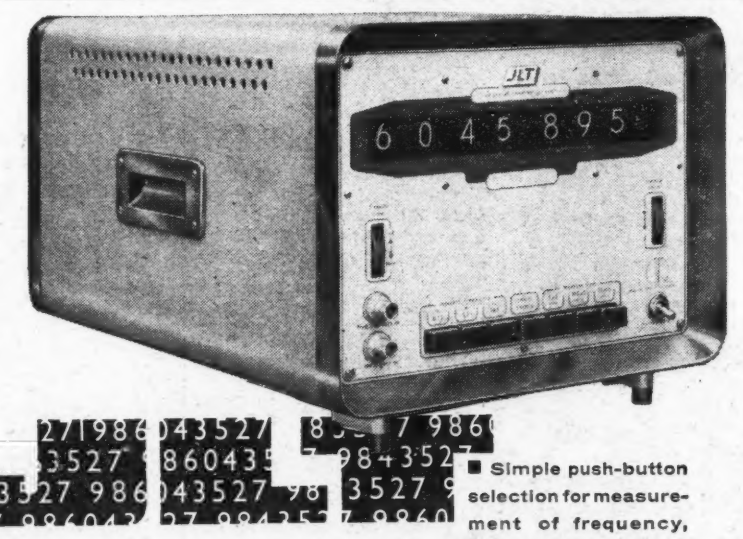
A pneumatic storage devic has been produced and teste in the Pneumatics Laboratory o ENIMS—the Experimental Scien tific Research Institute for Met Cutting Machine Tools, Mosco —which, it is claimed, can b built into any machine tool o automatic line where the workin tool has periodically to opera through a definite number o cycles.

The system has two inp channels which are connected the outputs of an ordinary tw positioned four-way air distribute which constitutes the comman valve.

Using this device as a basi component, a system containin any number of units ca apparently be built.

Those responsible for th scheme claim that it has worke satisfactorily in the range 2-6 k sq. cm and that the system ca be extended to hydro-automatic units.

It may well be that these uni form the basis of the pneumat computer recently exhibited at th Soviet Exhibition in Earls Cou London.



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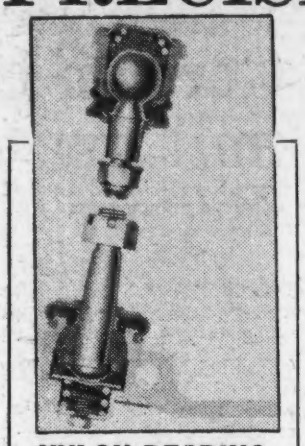
PRECISION IN WORK HOLDING



NYLON-BEARING SUSPENSION

TWO suspension joints of new design are being shown at the Earls Court Motor Show by Automotive Products Co., Ltd., of Leamington, together with self-lubricating steering joints which permit elimination of up to six greasing points.

These are now being supplied for the Singer Vogue and other Rootes Group models.

The top suspension joint, uppermost in the photograph, has a spherical ball pin supported in two nylon bearings which are compounded with lubricant during manufacture. Ball pins are made from high-grade steel and are plated.

Backlash avoided

This greaser-less suspension joint gives controlled end lift with freedom from backlash and more positive steering.

The lower assembly shows a cut-away view of the bottom suspension joint. This joint is self-adjusting and takes up all backlash

A separate spherical nylon bearing houses the pin and all rotational movement is taken by the mushroom ledge.

Bump and rebound movements are taken by the socket body and spherical bearing. This joint is pre-packed with grease on assembly and requires only occasional checking.

Diaphragm chucks ensure high accuracy

WORK-HOLDING problems associated with machining precision parts to very close tolerances have been solved by Borg-Warner Ltd., on the production line for their new model 35 automatic car-transmission units, by using diaphragm chucks developed by Pratt and Co., Halifax.

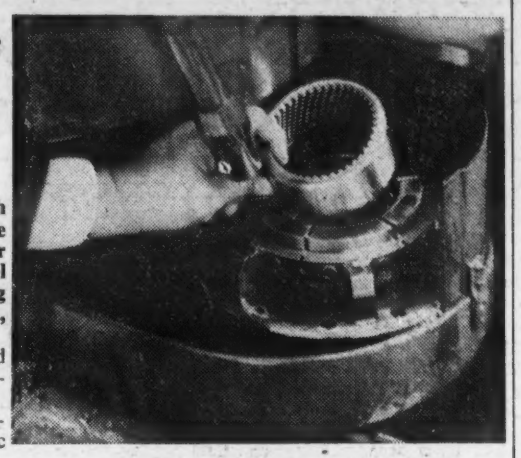
Used for grinding, fine turning, boring and facing operations the chucks ensure high concentricity and accurate lengths.

The principle is to deform a flat metal diaphragm by mechanical, hydraulic or pneumatic means, and then use the stored energy to grip the work when the pressure on the diaphragm is released.

Certain restrictions have to be borne in mind in considering whether this method of chucking is suitable for a particular job as the jaws have only a limited movement and the part must have a machined surface where the jaws grip.

When a component has to be machined to accurate lengths, end stops can be provided as the diaphragm tends to pull the component back against the stop during the closing action and provides accurate location.

One of the B-W applications is shown in the accompanying illustration which shows the loading of a ring gear into a six-jaw diaphragm chuck on a Maxicut gear shaper.



A ring gear, part of the new Borg-Warner automatic car transmission described in our first issue, being loaded into a six-jaw diaphragm-chuck on a Maxicut gear shaper, at Borg-Warner's Letchworth factory.

The allowed tolerance is as much as 0.0015in., but the subsequent shaving operation is to 0.0004in. Experience has shown that only about 0.0001 or 0.0002in. need be removed because of the accurate concentricity of the shaping chuck.

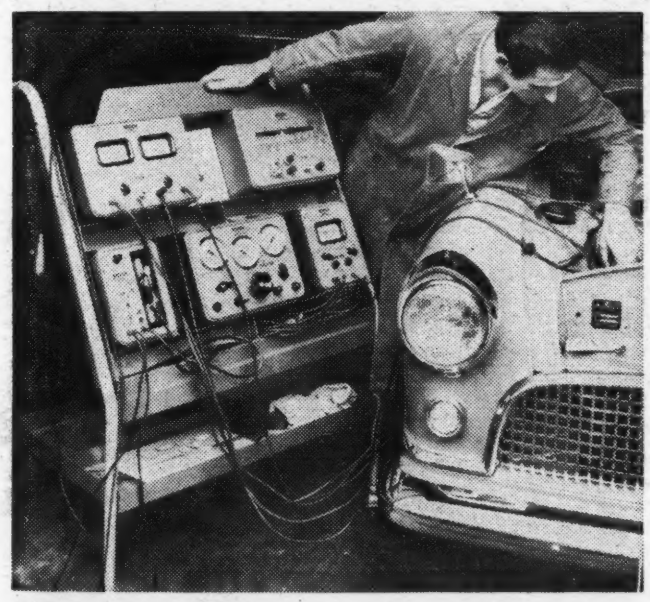
Another feature of the chucks is that they are capable of holding thin-wall parts with a controllable reduced gripping force. An aluminium clutch piston, for example, is held by its thin rim in an internal diaphragm chuck for facing and boring on an Ex-Cell-O fine borer.

Hydrogen leak test service

A LEAK testing service, equally applicable to vacuum and pressure vessels, using mass spectrometer techniques, is now being offered by Spembly Ltd. of Chatham.

In pressure-vessel work vacuum testing is valuable as a preliminary to pressure testing as, by using a light gas, defects in welds and porosity, etc., are more readily located than when liquid is used. In addition the metal remains uncontaminated and makes rectification of defects easier.

SEVEN-UNIT TESTER FOR CAR ENGINES



A TESTING and checking unit for motor vehicle engine and electrical equipment is being shown for the first time in this country by Bosch Ltd., at the International Motor Show which opened this week at Earls Court, London.

The unit incorporates seven entirely independent instruments, designed to meet the economic requirements of motor-vehicle repair shops.

Instruments available as separate units are as follows: volt and ampere tester; closing angle and speed tester; ignition tester; load resistance; ignition coil and condenser tester; vacuum and pressure tester and stroboscope.

These units may be housed in the specially-designed castored trolley with tool compartments.

FROM OUR PARLIAMENTARY CORRESPONDENT

House must now face industrial problems

PARLIAMENT has returned from recess on Tuesday — a little earlier than originally planned — to debate the international scene.

But the scene at home presents many pressing problems which await the attention of MPs when they get back to work in earnest in the new parliamentary session which opens at the end of this month.

An outstanding problem is the darkening industrial picture which obviously requires urgent consideration. The car industry, which continues to be afflicted with disputes, seems a prime example.

This is a sector of industry which, because of its obvious importance — particularly from the export angle — often comes under the Westminster spotlight one way and another.

Motor questions

Certainly, MPs from the motor manufacturing constituencies will be anxious to question the appropriate minister about the latest position and about future prospects when they get the chance after a three-months' break from the House.

Government statements are also pending on a number of important projects such as the Channel tunnel, the Victoria underground line, the development of a nuclear-propelled merchant ship and of a supersonic airliner, and the building of the new Queen ship.

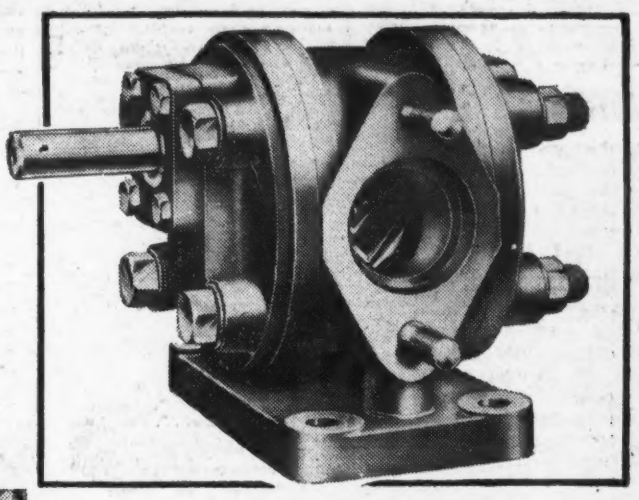
Office conditions

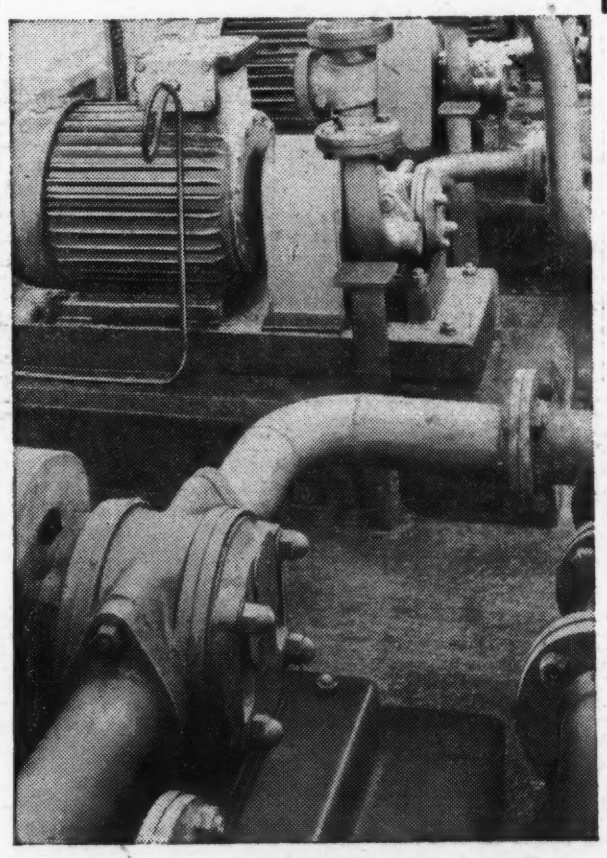
Among pending legislation is a measure which will affect the offices of engineering and other firms. A Bill is due some time on the subject of health, welfare and safety of office and shop workers.

It will regulate conditions of work in office premises, and cover matters like lighting, ventilation, sanitary and washing arrangements, and safety precautions.

An announcement on it may be included in the Queen's Speech.

When smooth pre-determined flow is essential . .





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.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

Westinghouse develop lining for MHD generator

CERAMICS RESIST ION-GAS STREAM

50-minute record set by test model

NEW YORK

CERAMICS, rather than iron or steel, may be key materials for building electric power generators of the future. Westinghouse Electric Corporation scientists have shown them to be the best substances for holding in check white-hot streams of gases in magneto-hydrodynamic (MHD) generators.

They have operated an experimental MHD generator, using ceramics, continuously for record periods of time up to 50 minutes. The usual operating period for such generators is only a few seconds.

In MHD generators, a moving stream of ionised conducting gas, called a plasma, as hot as 5,000 degrees and with speeds up to 2,000 miles an hour, replaces the moving copper conductors of a conventional generator.

THREE-MAN TEAM EXPERIMENT ON 10kW MACHINE

The main problem in practical MHD power generation has been in finding materials to line the walls that contain this white-hot stream. Most materials melt, burn up, oxidise, crack from heat shock, or erode in the rushing gas.

The use of ceramics by no means solves the problem of long-time, large-scale MHD power generation. It is, however, a first step towards the kinds of materials that may make MHD power feasible.

Dr. S. W. Herwald, Westinghouse vice-president of research, said that a team of three scientists have been working on the tests.

They are W. E. Blodgett, T. M. Harkulich, and Dr. W. E. Young. Studies of the operating performance of the materials were carried out on an experimental 10-kilowatt MHD generator.

Because they generally possess high melting point, hardness and chemical inertness, ceramics are good candidates as MHD materials. Dr. Herwald said that an MHD generator requires two basic types of refractory materials: an electrical insulating material for lining the walls of the generator; and an electrical conducting material for the electrodes.

Extremes

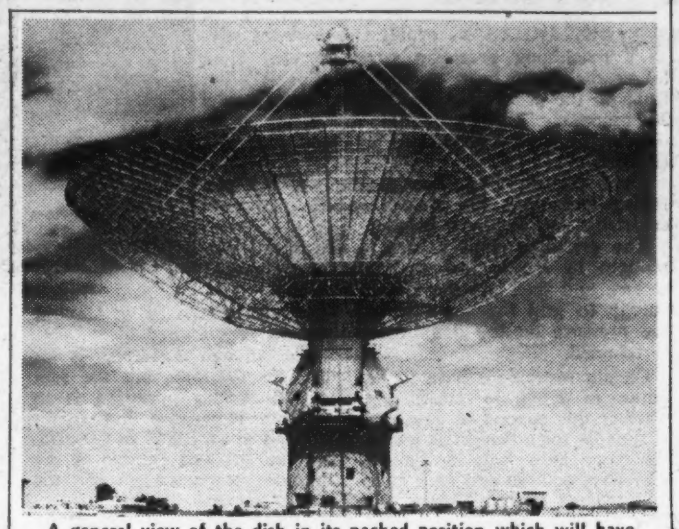
The insulating materials are also needed to keep the electrodes, located in the walls, from shorting out.

The environment of the electrodes is even more severe. They are subject to the full heat and blast of the gas stream and cannot be water cooled. This makes electrode materials probably the most difficult of MHD materials problems.

Among the insulating ceramics tested the Westinghouse scientists reported that magnesia (magnesium oxide) performed well as an MHD generator lining material.

Another ceramic, zirconium oxide, showed good endurance under MHD operating conditions. Other materials, including zirconium silicate and beryllium oxide, were found to be less satisfactory.

Among electrode materials, refractory metals such as tungsten, tantalum and zirconium were evaluated, as well as some of their alloys and compounds. Most of the materials showed a tendency to oxidise or melt before the generator's ceramic wall linings were seriously affected.



A general view of the dish in its packed position which will have to be used when winds are over 25 m.p.h.

Australia's radio telescope ready

SYDNEY

JODRELL BANK's successor is a new radio telescope being built for Commonwealth & Scientific & Industrial Research Organisation (CSIRO) at Parkes, New South Wales. It is scheduled to go into operation on October 31.

Although the dish (210ft. diameter) is 40ft. less than Jodrell Bank, it is expected to give a better performance.

It can be used from full aperture down to a wavelength of 21 cms.

It can be steered to an accuracy of one-sixteenth of a degree. The tower is 42ft. high, and total weight on foundations is 1,750 tons.

Cost of the telescope is £A611,500. Designers are the English firm of Freeman Fox and Partners of London. It was built by West Germany's M.A.N. in under two years. Metropolitan Vickers of Manchester supplied the servo-control system.

ZINC PROCESS

AN automatic electrolytic process for continuous production of zinc has been developed at the Soviet Non-Ferrous Metals Research Institute.

Zinc is deposited in thin layers on an aluminium strip passing through a hermetically enclosed electrolyser. On leaving the tank, the strip is coiled, the aluminium being continuously stripped off.

German mill for Britain

DUSSELDORF

A CONTINUOUS billet mill and a continuous rod mill including all ancillary equipment are being built by Schloemann Aktiengesellschaft, Dusseldorf, on behalf of Messrs. Appleby-Frodingham Steel Co. of Scunthorpe.

Both plants are scheduled to start production in 1962.

The four-strand billet mill with advance two-high reversing strand will be used primarily for preparation of the starting material required for the rod mill; it will also manufacture semi-products for direct resale.

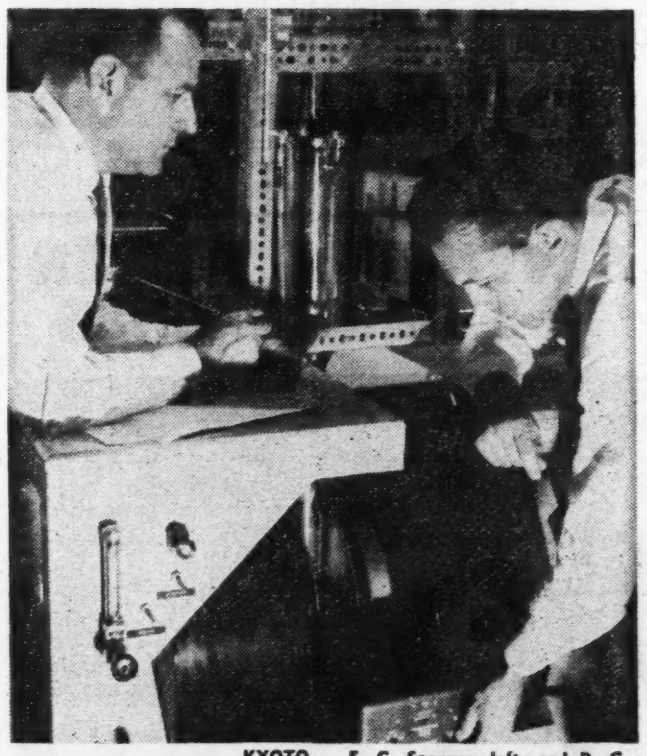
Four-strand rolling

The rod mill is designed to handle a diameter range of from 7/32 in. to 1-1/8 in. at a monthly output of up to 30,000 tons.

The unit provides for four-strand rolling in the roughing train, and two-strand operation in both intermediate trains, as well as the finishing trains.

THE BELLAMB COAL CO., of Australia has won a contract to supply 410,000 tons of hard coking coal to the steel industry in Japan. The order will be filled from their colliery at South Bulli, N.S.W.

U.S. SUCCESS AT THE KYOTO CONFERENCE



KYOTO

E. G. Spencer, left, and R. C. LeCraw adjust apparatus used to measure ferromagnetic resonance of yttrium iron garnet.

AN advance in the understanding of yttrium iron garnet (YIG) was revealed by scientists from the Bell Telephone Laboratories, New York, at the International Conference on Magnetism and Crystallography held recently in Kyoto, Japan.

A paper read by R. C. LeCraw and E. G. Spencer discussed YIG —a material which is similar to the ferrites in that it is both ferrimagnetic and an electrical insulator.

Primary technique

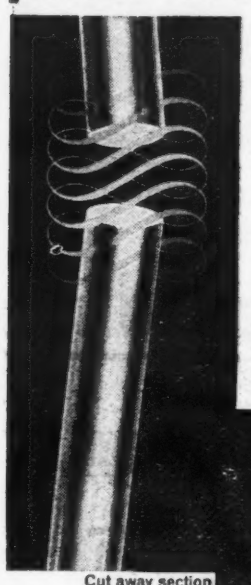
One of the primary techniques used in studies of these ferrimagnetic insulators is measurement of the "ferromagnetic resonance linewidth".

The authors reported ferromagnetic linewidths of only 0.14 oersteds at room temperature and 6,000 Mc/s in YIG—the narrowest linewidth ever reported for a ferrimagnetic material. The best ferrites have linewidths of about 5 oe.

LeCraw and Spencer found that surface roughness of YIG crystals had a large effect, and that the residual linewidth at low temperatures is caused by ferrous ions. By polishing the crystals and removing impurities, the linewidth was lowered to 0.14 oe.

FOOTNOTE: A report on the Conference is given on page 5.

METASTREAM improves power transmission

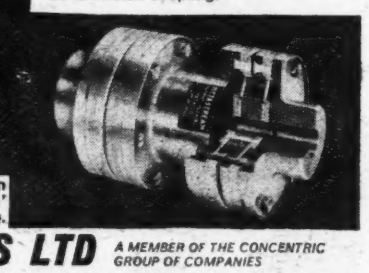


Metastream couplings will deal with angular and lateral malalignment and a combination of both.

The maximum amount of malalignment will depend upon the drive and conditions. Angular displacements of up to 2° and lateral differences of up to 0.3" can be accommodated. Metastream couplings are all metal, *do not require lubrication*, provide axial flexibility and are torsionally rigid, and cost little more than ordinary couplings. The only entirely satisfactory method of direct coupling is by **METASTREAM COUPLINGS.**

Available in a range of 9 series . . . 16 types . . . 300 sizes. All popular sizes can be supplied ex stock.

If you have a power transmission problem, write for details NOW—of the world's finest flexible power transmission coupling.



Cut away section of Metastream 'M' Series Coupling.

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P.6682

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THE LEWIS SPRING CO. LTD. have designed and introduced, especially for the engineer, a new range of Boxed Springs. The easy-to-follow Charts in the box lids give full details of Outside Diameter — Free Length/Length inside Loops — Number of Working Coils — Wire Diameter — Rate and Load at Full Compression/Extended Length inside Loops under load, in addition to the simplest of methods for re-ordering individual Springs. Deliveries of Boxes or Separate Springs Ex-Stock, London Office or Head Office, Redditch. Ring or write for illustrated leaflets and our handbook on Spring Design.

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London Office: 122 HIGH HOLBORN, W.C.1 Telephone: Holborn 7479 & 7470

NEW Equipment

Collapsible pallet needs no brace

A PATENTED design for joints used in the posts of the Stephens Collapsible Pallet permits rigid stacking without bracing or tie bars. Size and construction can be varied and posts may be square or round.

Pallets of 8in. high can also be stacked, folded. No screws or catches have to be undone when the posts are folded. **E. Stephens and Son Ltd., 58 Bath Street, London, E.C.1.**

Reader service reference No. 66

COLLAPSIBLE PALLET
No screws or catches

Magnetic separator

Magnetically held bridges incorporated in the Rapid Magnetic WY/WZ range of chute separators for free-flowing materials ensure that during a power failure the material is diverted from the main flow.

A WY unit, 18in. wide with two poles, is capable of treating approximately 20 tons/hr. and the WZ units will handle double this throughput.

Totally enclosed types with the associated trunking can be supplied to customers' specifications. **Rapid Magnetic Ltd., Lombard Street, Birmingham, 12.**

MAGNETIC SEPARATOR
Safe power-cut

Reader service reference No. 67

Air conditioner

By using Frescon packaged air conditioning plant it is claimed that high installation and ductwork costs of a central plant are avoided.

The only external connections required are for electricity and water, and in most cases adequate fresh air is obtained through normal doorways.

The complete unit is contained in a compact sheet steel cabinet divided into lower, middle and upper sections. Air is drawn in through the middle section and passed through a refrigerating element.

Excess moisture is condensed in this section and the air is then discharged back to the room from the top of the unit.

In the bottom section of the cabinet is housed a multi-cylinder compressor in unit with an electric driving motor.

Associated with the compressor is a water-cooled condenser and a liquid receiver to hold the refrigerant. An air-cooled condenser may be specified for certain applications.

All electrical equipment, including a main isolating switch and automatic starters for the compressor and fan motors, are built into the cabinet.

Six standard units are available, with ratings of from 3.3 to 19.0 tons of refrigeration. **AEI-Birlec Ltd., Tyburn Road, Erdington, Birmingham, 24.**

Reader service reference No. 68

Tote pan racks

Racks for work pans or tote pans can be built up to any height with Stacrac units. They are 9in. high and will each support a load of 2 cwt.

All pans are readily accessible and can be stored horizontal or tilted.

The range is designed to take standard 12in., 18in. or 24in. galvanized tote pans. **The Welconstruct Co. Ltd., 35 Carrs Lane, Birmingham, 4.**

Reader service reference No. 69

Dipping unit

Speeds of immersion and withdrawal are infinitely variable down to 1/16 in./min. on the latest version of the Cotswold Mark VII controlled extraction latex dipping machine.

An object of the design has been to produce a compact production unit.

A stainless steel circulating tank is provided for the latex and there is also a stainless coagulant tank.

A lightweight wheeled trolley which can hold a batch of formers 2ft. 3in. by 1ft. 6in. can be moved along guide rails over either tank.

The complete rail assembly is mounted on 32 ball races and moves up and down circular guide bars under the control of a hydraulic unit.

The inner frame of the trolley can be rotated or inverted as required and is fitted with roller guides into which individual former bars or batches of former bars can be inserted. **Lionel Hook and Sons Ltd., Stroud, Glos.**

Reader service reference No. 70

Packaged boilers

Although of Swiss design, Vauxhall Golcalor hot water boilers are constructed to British Standards.

Models with outputs of from 300,000 to 2 million B.Th.U./hr. are available.

Burners can be supplied for 35 sec., 200 sec. or 950c. oils. No brickwork or quarls of any kind are required and the boilers are heavily lagged and cased overall. Standard pressures are 65, 100 and 150 lb./sq. in.

The boilers are of three-pass cylindrical design, annular waterways being arranged within each other, with annular gas passages between the waterways.

The burner fires into a central tubular furnace. The various cylinders are not concentric, and this ensures even gas distribution and prevents the possibility of combustion vibration being transmitted to the metal parts.

The waterways are secured only at the front, the cylinders being entirely free to expand. A hinged full face door at the front gives access to the furnace and all annular gas passages.

Standard fittings include a safety valve, drain cock, pressure gauge and flow temperature gauge. **The Vauxhall Boiler Co. Ltd., Bondway House, Bondway, London, S.W.8.**

Reader service reference No. 71

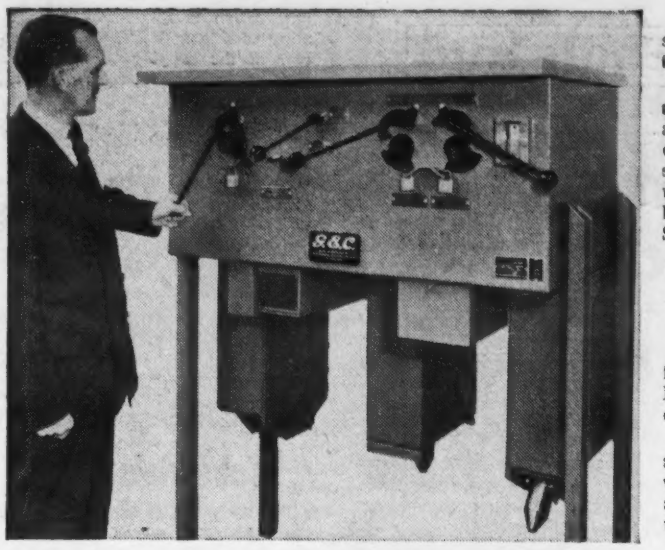
Ring main unit

A fused tee-off circuit capable of controlling circuits up to that of an 11 kV., 1,500 kVA. transformer is incorporated in the General Electric Type DDFA ring main unit.

It comprises two 400-A. load-breaking, fault-making oil switches controlling the ring main circuit, with a smaller oil switch, fuses and off-load isolator in the tee-off circuit.

To ensure safety during the replacement of fuses, the off-load isolator disconnects all the fuses from the ring main circuit and connects them to earth, and this isolator can only be operated when the tee-off oil switch is in the "Off" or "Earth" position.

The operation of any one fuse isolates all three fuses. Cable earthing and testing facilities are built-in. The unit is completely weatherproof. **The General Electric Co. Ltd. of England, Witton, Birmingham, 6.**



RING MAIN UNIT
Fused tee-off circuit

Reader service reference No. 72

Filter drain

A drain valve which operates automatically when the liquid level reaches a set height is now fitted to Doulton F.101 compressed air filters.

In addition, a new lubricator allows the amount of oil mist introduced to be widely varied, and gives visual indication of the oiling rate.

The filter has a multi-stage cleaning action to remove both solid and liquid inclusions.

Accumulation of liquid in the sump of the filter causes the float to lift and open the pilot valve.

This admits compressed air to a pilot chamber where it actuates an oil-resistant synthetic rubber diaphragm to open the main scavenge valve, thus draining the unit. **Doulton Industrial Porcelains Ltd., Wilnecots, Tamworth, Staffs.**

Reader service reference No. 73

Batch counter

Both manual and electrical reset facilities are provided on the Lancashire Dynamo Series P43 electromagnetic counter.

The operator can set manually any batch size up to 999,999 and when the set number is reached an internal switch is actuated; the unit also indicates total count.

Maximum counting speed is 1,500 impulses a minute and the construction allows plug-in installation, the building up of blocks of counters with interlocking castings, and alternative flush panel or proud mounting.

The units are designed for a range of supply voltages from 6 to 220 volts. **Lancashire Dynamo Electronic Products Ltd., Rugeley, Staffs.**

Reader service reference No. 74

READER GUIDE

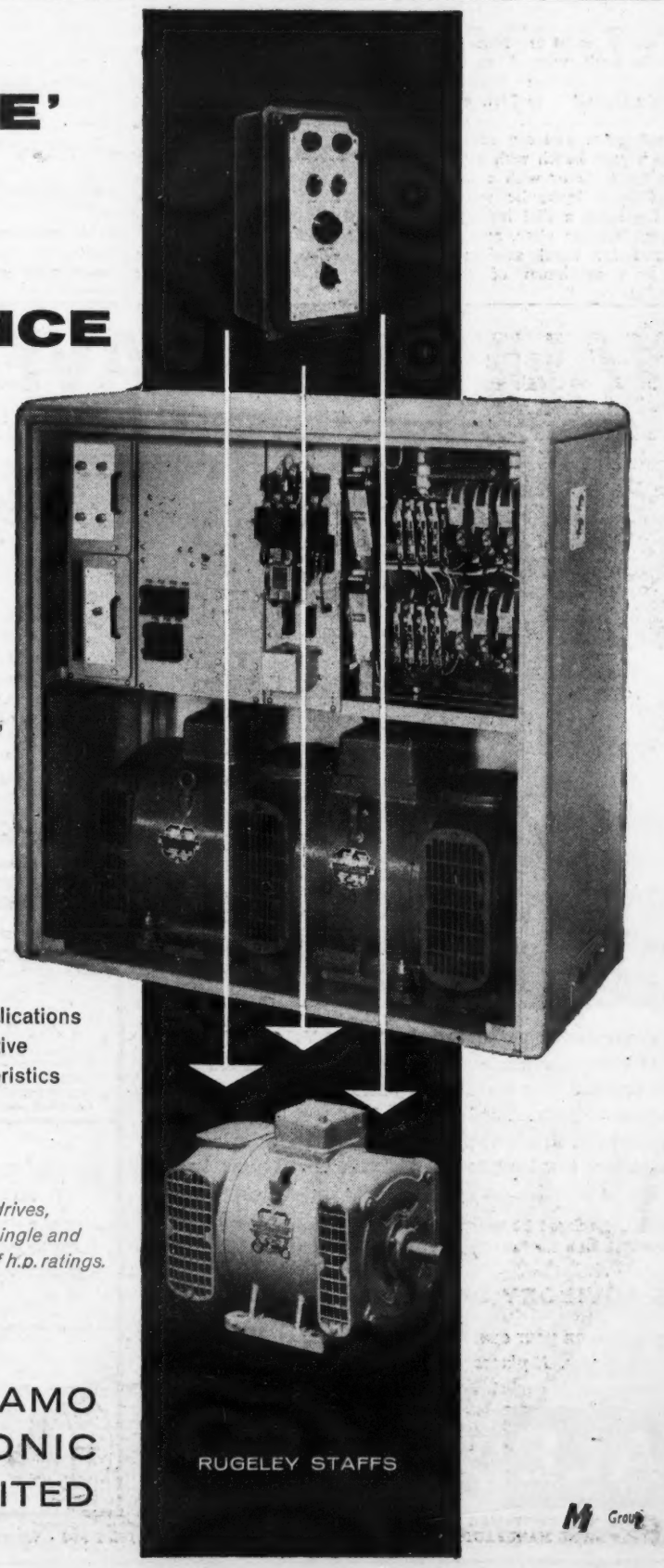
ON this page we publish the latest information on new equipment of interest to engineers.

Included: Inspection and test equipment, production machinery, factory plant and measuring and control equipment. Fill in the Reader Service Card on page 17 for further details of any items on pages 15 and 16.

'TRANSIDYNE' MEANS PACKAGED PERFORMANCE

Precise transistor control of motor speed with this easily installed Transidyne controller

In ratings from 1 to 10 h.p., this range of highly rationalised drives is available with a wide variety of optional features, including reversal, dynamic braking, inching, tachogenerator control and a range of motor base-speeds, enclosures and mountings. A remote mounting control station provides pushbutton starting, reversing and fingertip speed setting.



Transidyne drives are specially suited to applications involving overhauling loads, since regenerative braking is provided by the inherent characteristics of the motor-generator arrangement.

In addition to the standard range of Transidyne drives, there is also available a considerable variety of single and multi-motor installations covering a wide range of h.p. ratings.

Write, giving application details, for publication B32011

LANCASHIRE DYNAMO ELECTRONIC PRODUCTS LIMITED

SP2

M Group

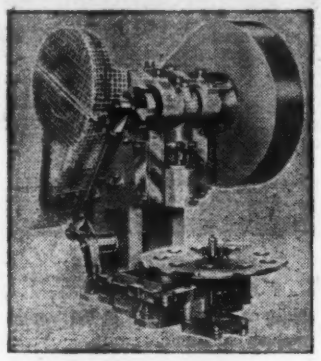
NEW Tools and Machines

Nine stations on dial-feed press

A DIAL-FEED plate with nine stations which can be jig bored to customers' specifications is fitted to a 6-ton back-geared Worcester press. There is a choice of three fixed strokes: 1¼in., ¾in. or ½in., and the ram speed is 50 strokes a minute.

Bed size is 12in. wide by 8½in., open tool height 8in., throat depth 4½in., and there is a ram adjustment of 1½in. **Jones & Attwood Ltd., Stourbridge.**

Reader service reference No. 75



DIAL-FEED PRESS
Fixed-stroke choice

Rolling table saw

Said to be particularly suitable for small diameter saw-logs and thinnings now becoming available, the Stenner VJM.36 rolling table bandsaw has 36-in. pulleys carrying tensioned bandsaws 3in. in width, giving a negligible wastage in saw-kerf.

The rolling tables are 14in. and 10in. wide and mounted on ball bearing rollers; they are available in lengths from 6ft. to 20ft.

The machine has a 15 h.p. self-contained motor and can be supplied as a push bench with a grip bar on the table or with a table powered by a hydraulic system.

The fence has a dial indicator, a long plain fence plate, and can be canted for bevel sawing; it opens to a maximum of 10in. from the sawline. For occasional deep work, the sawguides can be adjusted up to 12in. above the table level. **Stenners of Tiverton Ltd., Tiverton, Devon.**

Reader service reference No. 76

Copying unit

Copy turning equipment can now be supplied for the smallest Lang centre lathe, the 13-in. swing model J6.

The attachment will turn a maximum diameter of 6½in., can produce a maximum step of 2¾in., and there is a total tool adjustment of 2¾in.

The unit consists of two main components: a valve and cylinder unit which is housed in a light alloy casting and mounted at the rear of the copying slide; and a tank assembly incorporating a rotary pump.

The tank assembly is free-standing and its position can be chosen to suit workshop layout.

Micrometer controls are provided for diameter and the longitudinal setting of the tool.

Two centres are mounted on an accurately machined beam at the back of the lathe to support cylindrical masters and the tops of these centres are machined flat to accommodate flat masters. **John Lang & Sons, Johnstone, Renfrewshire.**

Reader service reference No. 77

Tube deburrer

By fitting the appropriate tools, the Leonard Tubemaster model C can be made to perform such operations as flaring, squaring or beading in addition to the deburring of tubing.

Production rates of 500 to 700 ends an hour can be achieved, depending on the length of the tubing and the convenience of the handling arrangements.

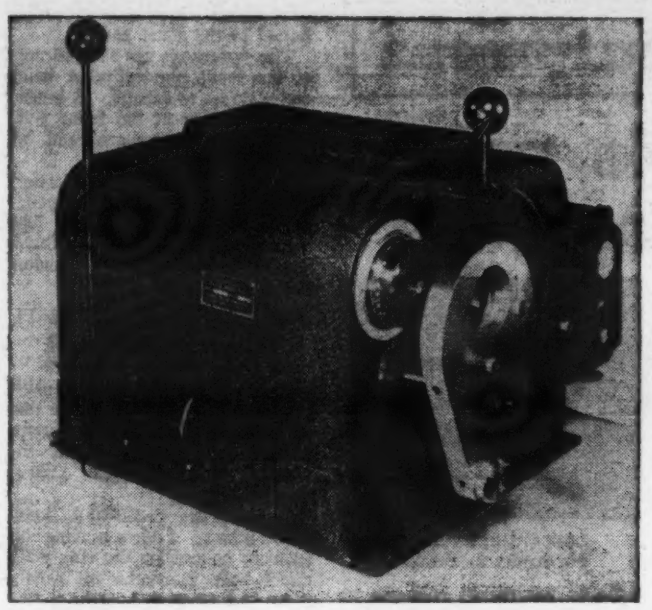
Only two controls are fitted, one operates the clamping mechanism for the work while the other brings the cutter spindle into operation.

Deburring capacity is ¼in. to 1½in. diameter non-ferrous tubing, ¼in. to ¾in. diameter ferrous. **The Addison Tool Co. Ltd., Addison House, Marshalsea Road, London, S.E.1.**

Reader service reference No. 78

Complete packager

A complete range of filling, cartoning, wrapping and sealing machinery made by Costruzioni Automatiche Martelli (CAM), of Bolgna, Italy, is now availble in this country.



TUBE DEBURRER
Also flares, squares, and beads

CAM machines will handle 3,600 to 7,000 cartons an hour and can perform the following operations: take a carton from the magazine, stamp it and erect it; wrap the product in corrugated cardboard with instruction or sales leaflet; close the carton by glueing or tucking in flaps; fix seals.

Attachments are also available for a variety of additional operations.

All machines have safety devices to synchronize the feeding-in of all items and to stop the machine in the event of an obstruction. **Flexile Metal Co. Ltd., Bassemer Drive, Stevenage, Herts.**

Reader service reference No. 79

Special-purpose hone

A complete installation for honing diesel engine cylinders has just been supplied by a British firm to an Italian tractor manufacturer.

Two vertical hydraulic honing machines are mounted on a common base with an electrically controlled indexing and work holding fixture and a final surface finish of 6-8 micro-inches is produced in cast iron bores approximately 4¼in. in diameter.

The tolerance on the finished bore size is ± 0.0005in.

The work holding fixture is hydraulically operated and has four stations spaced at 90 deg. Two adjacent stations are under the honing spindles at the same time while the others are free for loading and unloading.

The present application calls for a roughing and finishing operation on each component and the table indexes 90° between each cycle, transferring a newly-loaded component to the right-hand honing machine and a rough-honed component to the left-hand machine.

At each honing station a hydraulic jack raises the component and holds it clamped against a bridge piece throughout the honing cycle.

At the bottom of the first stroke the honing stones are expanded by hydraulic pressure and hone rotation commences.

Honing then proceeds independently at the two stations, each machine being automatically controlled. **Delapena & Son Ltd., Tewkesbury Road, Cheltenham, Glos.**

Reader service reference No. 80

NEW Publications

A 24-page brochure from British Resin Products Ltd.—**The Cellobond Polyester Story**—illustrates how the properties of polyester glass, i.e. high strength-to-weight ratio and resistance to chemicals and weathering without the protection of paint, have been put to good use in nine major industries.

There is an introductory section on the manufacture, properties, and applications of Cellobond polyester resins.

Reader service reference No. 81

To illustrate the wide range of Duraglas glass fibre insulating tapes which they manufacture, Turner Brothers Asbestos Co. have issued a compact sample card.

All tapes comply with the specification for glass fibre woven tapes laid down by the British Electrical and Allied Industries Research Association, and they are described in a booklet issued with the sample card.

Reader service reference No. 82

A leaflet giving factual information on Key perforated pipes for sub-soil drainage is now available from the Key Engineering Co, Ltd.

The pipes are supplied in 8ft. and 5ft. lengths in diameters of 3, 4 or 6 in. and are perforated in lines at regular intervals along a 120-deg. arc between the horizontal and vertical diameters.

The leaflet points out that when the pipes are laid with the holes below the horizontal, ground water enters from below and there is no chance of soil passing into the drain and causing a blockage.

Reader service reference No. 83

Information on the polyether Daltocel T56 and the isocyanate Suprasec EN are given in pamphlet No. 10 in the Urethene chemicals Literature series produced by the Dyestuffs Division of Imperial Chemical Industries Ltd.

It contains sections on the foam-making process, equipment, foam formulation, and the range of physical properties obtainable.

Reader service reference No. 84

A series of leaflets has recently been published by the Cambridge Instrument Co. Ltd. on the range of instruments made by the Mechanical Thermometer Division and now available from stock.

These include dial-type thermometers with vapour-pressure and mercury instilled systems, temperature regulations, draught and pressure indicators and recorders, and humidity instruments.

Reader service reference No. 85

Computers, the future and you—a 12-page booklet produced by Business Publications Ltd., has been written with the object of providing information on the subject for directors and executives.

It illustrates the uses that different types of companies have made of computers and gives some indication of other future uses and the revolutionary effects they could bring to the way concerns are managed. A simplified account of how a computer functions is included.

Reader service reference No. 86

An illustrated booklet, **A.C. motors**, designed to meet difficult site conditions, has been prepared by Crompton Parkingson. The types of enclosure available for motors of 250 h.p. and upwards are listed and their suitability for damp conditions and the protection they give against contaminated conditions are discussed in detail.

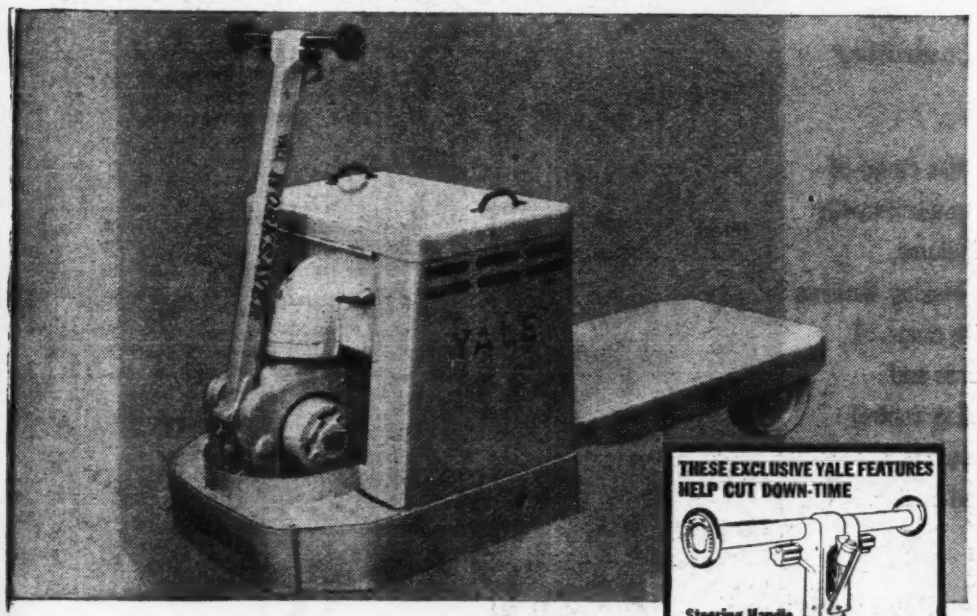
Reader service reference No. 87

A company brochure called **It all began with broaching**, has been produced by the Lapointe Machine Tool Co. covering the history of the firm, senior personnel, information about the factory premises, details of their range of machines and broaches, and the countries to which they export.

Reader service reference No. 88

YALE WORKSAVERS

...another name for dependability!



THESE EXCLUSIVE YALE FEATURES HELP CUT DOWN-TIME

Steering Handle
1 Safety guards protect hands of operator—indicate direction of travel for speed cams.
2 Two speeds, forward and reverse, within finger-tip reach of operator.

Drive Unit
1 Thrust bracket with tapered roller bearing.
2 Concentric silver alloy tip contacts.
3 High torque series-wound motor.
4 Split hub.

Drive Wheel mounting
1 Wheel hubs are slitted and tapered with splined bores to fit drive axle.
2 Only 4 bolts are required to pull wheel hubs tight together against tapered bore.

There's only one thing as dependable as a Yale Worksaver—and that's another Worksaver! These tough, manoeuvrable electric trucks bring versatile dependability to every handling and moving job . . . under all kinds of working conditions. Light, compact, simple to operate, they will work in confined areas and over low-load floors where the use of other trucks would not be practicable.

PALLET MODEL Capacities 2 & 3 tons FORK LIFT MODEL Capacities 1,500 to 3,000 lbs.
TRACTOR MODEL Draw Bar Pull: 700 lbs. PLATFORM MODEL Capacities 2 & 3 tons

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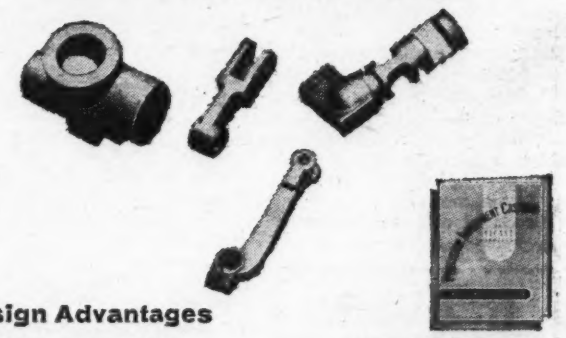
PICASTINGS

save machining costs

INVESTMENT CASTINGS
PRODUCED BY PICAST CENTRIFUGAL PROCESS



Design Advantages

* Elimination of assembly
* Complex or simple shapes
* Small or large quantities
* Uniformity of material structures
* Thin sections in high melting point alloys
* Reduction of secondary machining operations
* Freedom in choice of materials

Leaflet P.I.2 gives full details of the P.I. Castings process. Send for a copy today.

P. I. CASTINGS (ALTRINCHAM) LTD
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Telephone: Altrincham 2702 (5 lines) Grams: Precisely, Altrincham Telex 66-105 – A/B Atlantic Altchm.

NEW Components

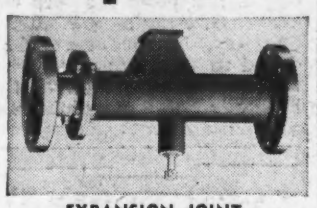
Ring joint allows running repair

RE-PACKING can be carried out without any shutdown on the Lancaster Fluid Ring expansion joints, available in bore sizes from 1½in. to 12in. A high viscosity sealing fluid is used for the packing, and this also acts as a lubricant.

The joint consists of two main components: a fixed steel tubular member with a ground bore and a steel tubular sliding member carrying two sets of piston rings, the complete unit being mounted on a welded supporting bracket.

Service packing is carried out by removing a screwed plunger from the top of the unit, inserting a plug of plastic packing, replacing the plunger and giving it a few turns. Blow-back of the packing is prevented by a non-return valve. **Lancaster & Tonge Ltd., Pendleton, Manchester, 6.**

Reader service reference No. 89

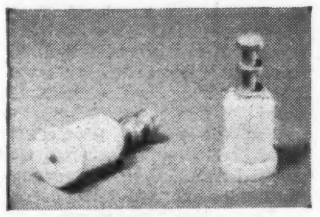


EXPANSION JOINT
Running repair

Test Jack

Design of the P.T.F.E. body of the SKT-34 "closed entry" test jack provides, in effect, a P.T.F.E. bush through which the probe slides before coming into contact with the beryllium copper contacts, thus giving perfect alignment.

The SKT-34 has a double-turret stud on the reverse side of the chassis and is designed to receive a 0.032 in. diameter probe to a depth of 0.2 in.



TEST JACK
Closed entry

The body is 0.148 in. diameter and is of the press fit type, allowing positive fixing by merely pressing into a hole in a metal chassis. **The Sealectro Corporation, Hersham Factory Estate, Walton-on-Thames, Surrey.**

Reader service reference No. 90

Cooling elements

Thermoelectric elements produced in Japan, offering direct competition to conventional refrigeration systems, are now available in this country.

They are manufactured by the Sanyo Electric Co. of Osaka and rely on the Peltier effect, i.e. when direct current is passed across the junction of two dissimilar conductors, heat is either emitted or absorbed, according to the direction of the current.

A new technique evolved by Sanyo is said to remove the disadvantages of high cost and brittleness previously encountered with the bismuth telluride alloys used in the production of the thermo-elements.

Efficiencies comparable with those of compressor systems are claimed. **G. W. Brown (Engineers) Ltd., 420 Ware Road, Hertford.**

Reader service reference No. 91

Spring pins

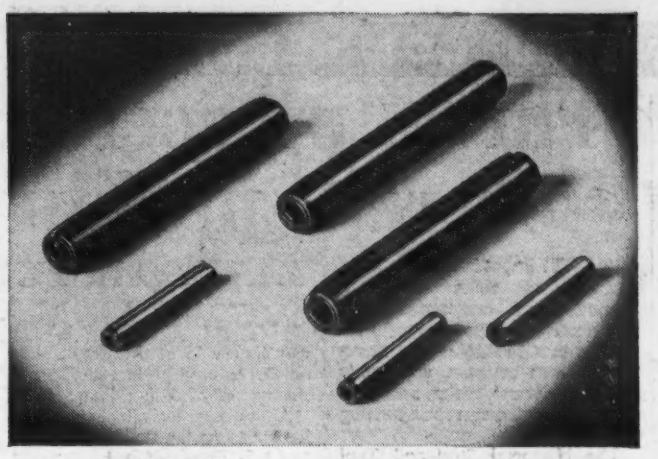
Chamfered lead-ins are now provided on Spirol spring pins to speed up assembly operations.

The size range is 1/32in. to ¼in. diameter by ¼in. to 4in. long, and the pins are made from carbon-chrome stainless or nickel stainless steels.

These pins are formed by spirally winding strip steel, and physical properties can be varied by changing the thickness of the material, the tightness of the coils, or the number of coils in the spiral.

Lateral loads are distributed evenly throughout the cross-section of the pins and it is claimed that there is no critical point where stress can concentrate whatever the direction of the load.

Wide hole tolerances can be employed when pins of this type are used, and they can be removed as easily as they are inserted without damage to the hole.



SPRING PINS
Assembly speed-up

Dimensions of the pins are so arranged that the shear strength of each size is proportional to the square of the diameter. **The Lewis Spring Co. Ltd., Redditch, Worcs.**

Reader service reference No. 92

Steel shelves

A range of steel shelves which can be supplied in different strengths to suit the loading has been introduced for use with the Dexion slotted angle system.

The size range will be 36in. wide by 12in., 18in., 24in., 30in. or 36in.

Light duty shelves are designed for loads up to 150lb., standard shelves for loads up to 450lb., and heavy duty for up to 900lb.

The 12in. and 18-in. shelves will be available in standard and heavy strengths, the 24-in. shelves in all three strengths, and there will be eleven different models in all. **The Dexion Group, Maygrove Road, London, N.W.6.**

Reader service reference No. 93

High-output servos

Greater mechanical rigidity, by reason of one-piece casings, and torque ratings up to 50 per cent above standard Mark 8, Model 0 induction servo-motors are features of the A.G.I. size 18 motors and 18/18 motor-generators.

Register dimensions are the same as standard size 18 synchros. Units are available in many voltage ratings at 50/60 or 400 cs./sec.

The motor-generators contain in the one-piece casing a servo-motor coupled to a separately excited tacho-generator. **Aeronautical & General Instruments Ltd., Purley Way, Croydon, Surrey.**

Reader service reference No. 94

NEW Materials

Heavy parts can now be cast in nylon

A TECHNIQUE for the production of finished nylon components of considerable mass, called monomer casting, has been developed. The process is performed at atmospheri cpressure, and, theoretically, there is no limit to the size of part that can be produced.

The material is called MC nylon, and is said to exhibit all the physical properties of industrial nylon.

General production methods are similar to those used in casting metals; chemical controls are required for the purity of the material and temperature control for the material and moulds.

Castings are substantially lower in cost than comparable stainless steel or brass castings.

Monomer casting does not compete with injection moulding for the mass production of small parts. **Polypenco Ltd., 68 Tewin Road, Welwyn Garden City, Herts.**

Reader service reference No. 95

Cutting oil spray

A cutting compound for reaming, drilling and tapping operations, Rocol R.T.D., is now available in aerosol containers which allow the lubricant to be introduced easily into confined spaces.

This method of application is inherently safer than using a brush and tin on a moving tool or workpiece, and it is possible to direct the compound into deep holes and slots. **Rocol Ltd., Rocol House, Swillington, Leeds.**

Reader service reference No. 96

Ceiling panel

Two layers of very thin P.V.C. separated by an airspace of 1in. give Thermalucent ceiling panel valuable insulating properties and it is claimed that heat savings can be up to 70 per cent when ceilings of this type are installed.

Another advantage of this design of panel is that any litter such as insects, soot or leaves which may accumulate on the top surface is not visible through the bottom layer of P.V.C.

A wide range of P.V.C. films of the self-extinguishing fire category can be specified. The standard module for the panels will be 40 in. **Isora Illuminating Ceilings Ltd., 216 Bedford Avenue, Slough, Bucks.**

Reader service reference No. 97

Belt dressing

Packaging in aerosol containers allows Sprazon belt dressing to be sprayed directly on to moving belts, frequently without even removing the guards.

The compound can be used on leather, rubber and fabric belts—flat or vee—to preserve the belts and to eliminate slip. Approximately 350 sq. ft. of belt surface can be treated with each 12-oz. container.—**Graton & Knight Ltd., Warwick Road, Boreham Wood, Herts.**

Reader service reference No. 98

3 ACOUSTIC WORKS CABINS

Burgess acoustically treated works' cabins and offices isolate your employees from the deafening, persistent noise of busy workshops. Made of robust acoustic sections, with double-glazed windows which admit light without the full volume of noise. Lighting and sound-trap ventilation systems can be incorporated.

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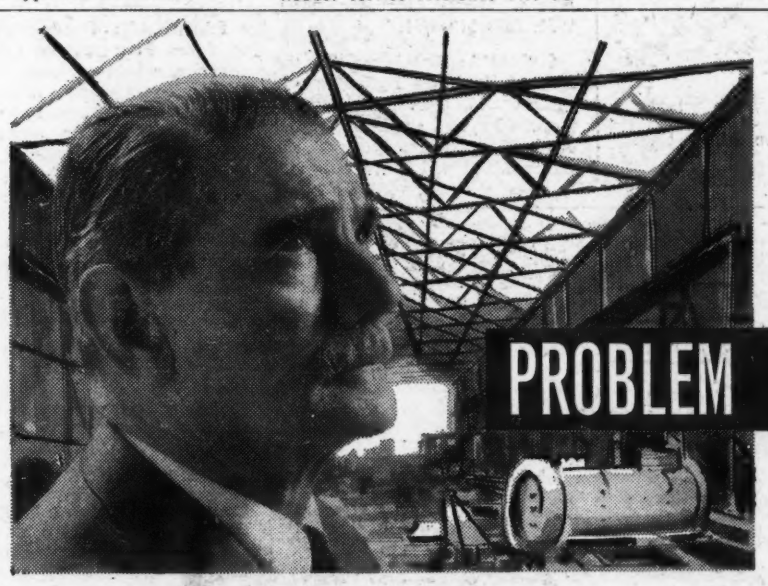

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FINANCE AND COMMERCE

BRITISH TRACTORS ON TOP

AGRICULTURAL tractor output in Britain rose again by a small margin in August, exports advancing slightly while home sales slipped slightly during the month.

Tractor sales by the West Germans, our main competitors, to other Common Market countries have risen by about £1 million in the first six months of this year.

In the same months the British advance has been more than three times as large with half the gains made in France and a fifth in West Germany.

In the first seven months of the year U.K. exports of agricultural machinery, excluding tractors, were worth £11.7 million, against £10.5 million in the first seven months of the previous year.

Total British tractor sales in the first half of 1961 reached £46.2 million, compared with £45.5 million in 1960's first half. The equivalent German figures were £13.2 million and £12.6 million.

Three prospered despite overall profits gloom

RANK SOAR TO £5 MILLION

THREE important companies, two of them household names, stand out against the threatening background of narrowing profit margins and rising costs. Each concern, vigorously pursuing diversification and product development, reports rising profits.

The Neepsend Steel and Tool Corporation, a forty-company Sheffield based group, has returned a 20 per cent improvement in the trading profit over the preceding year.

The rise is from £1,303,000 to £1,566,000, an even more interesting result in view of the chairman's remarks at the last meeting on the reduced profit margins and absorption of rising home costs.

Allowances for all charges and for tax trims the trading net profit to £765,000, which is 8.6 per cent better than the previous year's £704,000.

The dividend for the year stays at 50 per cent, the level maintained over the last six years.

Best known for its entertainment interests, the Rank Organisation has fingers in a number of industrial pies. Rank Precision Industries, Rank Xerox, and in colour television, Rank Cintel have all contributed to the 23 per cent of Rank group profits which came last year from manufacturing and general activities.

Profit for the group before tax rose from 1960's £4,002,764 to £5,082,240.

Dunlop Rubber have contrived to raise the net profit, marginally, although the company's "sales to customers" have fallen slightly below the level of last year.

Comparisons are between the first six months of this year and the first six of 1960. Sales to customers dipped from £136 million to £133 million. Before allowing for depreciation, interest and tax the net balance rose from £11.18 million to £11.88 million.

Before-tax net profit has risen to £6.94 million (against £6.75 million).

Firms expect to cut plant investment

FOR the first time in two years, replies to the Federation of British Industries' four-monthly inquiry into industrial trends shows a majority of firms expecting to spend less than they have on new plant and machinery.

Fifty-one per cent of the 686 companies taking part in the inquiry are now working below capacity, and 42 per cent believe that their output is likely to be limited in the next four months by lack of orders.

While optimism about business in general is heavily down, 24 per cent of firms feel more optimistic about their export prospects and 22 per cent feel less.

PROFIT DROP

RANSOME and Marles Bearing, the ball and roller bearing group, has returned a net trading surplus of £1,354,000, down 23 per cent on the previous year.

A much reduced figure for tax plus an increase in depreciation from £381,000 to £453,000 leaves a final net group profit for the year of £759,419 against last year's £902,513.

Export opportunities

AUSTRALIA: Coal handling plant, for the department of Public Works, New South Wales, at Port Kembla Inner Harbour, N.S.W. The plant is to have a capacity of 2,000 tons per hour, with provision for storage and reclaim. Tenders should be received at the Department of Public Works, Sydney, by January 2, 1961. ESB 31386/61.

CANADA: Switchgear, for the City of Winnipeg Hydro-Electric System. 14, 69kV 600 amp, 3-phase, 60 cycles, single-throw, end break group operated disconnecting switches. 14, 7.5kV, 1,200 amp, 3-phase, 60 cycles, vertical mounting, double blade tandem throw, manually group operated disconnecting switches. Spare parts for the above.

Bids to the committee on Utilities and Personnel, c./o. General Purchasing Agent, 185 King St., Winnipeg 2, Manitoba. Specification No. PD61-46. ESB 31919/61.

PAKISTAN: Food processing machines. Five aspirator machines for rice, wheat or other similar food grains. Issued by Director of Supply, P.I.D.C. House, Motijheel, Dacca. Bids quoting tender No. EPS/X11/1451/ENGG/61. Closing date November 7, 1961. ESB 31681/61.

HONG KONG: Steel Tubes: 514,200ft., medium grade, galvanized, conforming to B.S.S. 1387, 1957, table 1, lengths app. 20ft., nom. bores ranging from ¼in. to 5in. Bids to the Secretary, Tender Board, Colonial Secretariat, Government Offices, Lower Albert Road, Hong Kong. Ref. No. Stores C/52/13/1/61. Closing date November 3, 1961. ESB 31686/61.

AGENCIES

WEST GERMANY: Plastics, machinery and equipment, granulates for the plastics industry. Herr Heinz Herrmann, Berlin-Lankwitz, Siemensstrasse, 45a, wishes to represent British manufacturers of:—

Plastic injection moulding machines and presses.

Drying and pre-heating equipment for the plastics industry.

Granulates for the plastics industry.

Operating as a free-lance agent since 1936 representing makers of machine tools and the smaller type of plastic moulding machines, Herr Herrman is in touch with his principals about extending his agency area beyond West Berlin to certain areas of West Germany.

Inquiries should go to the Export Services Branch, Board Trade, Lacon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

Trade agreements

TWO AIRCRAFT FIRMS MERGE

THE first phase has been completed in a merger between Sir W. G. Armstrong Whitworth Ltd. and the Gloster Aircraft Company. The business of the two companies is now being conducted under the name of Whitworth Gloster Aircraft Ltd., and Gloster Aircraft has ceased trading under that name. Mr. H. Burroughes, chairman of the new company, was formerly chairman of Gloster Aircraft.

ENGINEERING CONTRACTS

G.E.C. machines for Europe

BLENDING machines for the Athus steelworks, Belgium, of Cockerill-Ougree, are to be provided by the General Electric Company of Great Britain.

The equipment will be incorporated in an ore-blending plant. It is made up of a reclaiming machine, transfer car and a double-hinged boom stacker.

Structural steelwork will be all fabricated in Holland. Other parts will be made in the UK and sent direct to the site.

* * *

A special Froude FA16 hydraulic dynamometer for installation at the Commonwealth Marine Engine Works, Melbourne, Australia, is to be supplied by Heenan and Froude Ltd., of Worcester

The dynamometer, rated for 20,000 b.h.p. at 166/225 r.p.m., is to be used for testing marine diesels produced under Doxford licence.

A Froude DPY7D dynamometer able to absorb and measure up to 3,500 b.h.p. at 1,150/2,500 r.p.m. has been ordered by Motoimport, of Poland.

* * *

Electrical equipment worth about £300,000 for a new pulp and paper mill in Yugoslavia is to be built by English Electric.

This equipment, power distribution gear and motors for driving the process machinery, is to be made at Stafford, Liverpool and Bradford. Delivery is due by mid-1963.

English Electric will supply a 35,000 volt outdoor substation made up of three oil circuit breakers and a 10 MVA transformer.

Increasing trade, particularly in machinery and machine tools, between Britain and West Germany has been partly responsible for the decision of the **Transport Ferry Service** to appoint three new agents in Germany.

The volume of traffic using the roll-on roll-off service between Tilbury and Antwerp/Rotterdam has considerably increased in the past year.

The new agents are in Hamburg, Frankfurt am Main, and Munich.

Goodenough Pumps Ltd. have taken over the 110-year-old Birmingham engineers, **Silas Hyde Ltd.,** manufacturers of industrial ovens, conveyor stoving plant, dust and fume removal plant, and ventilation systems.

TELCON changes

The functions of the engineering division of TELCON — the **Telegraph Construction and Maintenance Company** — are to be incorporated with Submarine Cables Ltd., which is jointly owned by **Associated Electrical Industries** and **British Insulated Callender's Cables.** TELCON, a member of the BICC group, has now ceased land cable activities.

All the mechanical and electrical engineering activities of TELCON, apart from Telconnectors, continue at the Greenwich works, including a range of marine equipment.

Allen West, the Brighton electric motor control gear makers have acquired a 56,000 sq. ft. government-built factory at Newtonards, Co. Down, Northern Ireland.

The works will be used for the assembly and wiring of the company's standard contactor panels. The move should ease the pressure on their Brighton works where manufacturing resources are under heavily increasing demand.

Work on mill resumes

WORK is being resumed on the £1,500,000 extension to the Bedford plant of W. H. A. Robertson, a company of the Tube Investments engineering division.

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To B.S.R. 2470/1954
Made from Chromium Molybdenum Alloy Steel to 100 T.T. P.S.I.

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KEEP THE VICKERS VA-1 AIRBORNE

A Meteor nylon-core belt was chosen for the vital 145 h.p. drive to the lift fans of VA-1, **and also acts as the clutch.** A Miraclo belt drives the 6,500 r.p.m. cooling fan for the main engine. Together they cost £18 and weigh 7lb.

The success of these applications supports the claim that Stephens Miraclo and Meteor belts provide the finest drive to modern industry.

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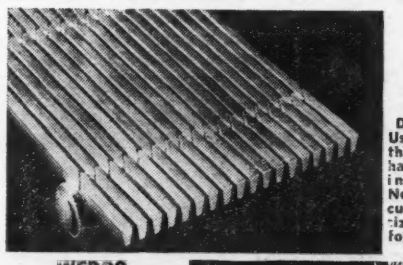

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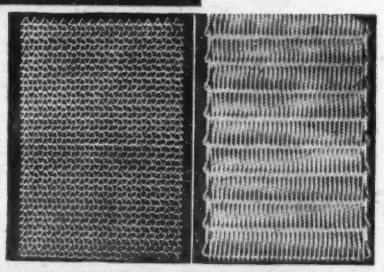

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BRITISH WEDGE WIRE CO LTD Warrington, England

FINANCE AND COMMERCE

Iron firm suspends expansion

PART of the modernisation and expansion scheme in which United Steel's Appleby-Frodingham concern is to invest £28 million has been suspended due to the trading conditions of the industry

Diversification becomes more important than increasing quantities of output as the industry's surplus of capacity rises, and the United Steel reaction is clearly shown in the decision to stick to the time-table for the new mills for rod and bars in coil.

Reviewing the raw materials needs over the next two years the company has decided that a possible shortage of iron within the group will not now arise until after the predicted date—the end of 1962.

Th result has been the suspension of part of the iron works expansion scheme. The long-term intention is to raise pig-iron capacity from 1.5 million tons to 1.95 million tons.

Exports highest ever

STEEL GAINS SLOWLY

But industry is still running at only 77 p.c. capacity

RECOVERY in steel output last month from the low levels of August still left the steel-making industry running at 77 per cent capacity. Reduced activity in the car firms, now the largest single group of steel users, and heavy reductions in stocks held by manufacturers and merchants led to a 17 per cent. fall in output this September from the level of a year earlier.

Iron and Steel Board figures show that in September steel production was running at a weekly average of 400,200 tons—a 61,800 ton improvement over August's of 338,400 tons.

One bright spot in the otherwise gloomy picture is the industry's export record. From only 135,000 tons a month in the years before the war, the monthly average for steel exports has climbed steadily to 257,000 tons a month from January to August.

Since steel imports have now fallen to 34,000 tons a month from the high rate of 103,000 tons a month last year the true exporting position of the British companies is much better than in any previous year.

Among the steel imports of this August were 6,000 tons of hot-rolled coil from the USSR. This is to be rolled into sheet and re-exported.

This year's falling steel production closely follows the pattern of 1958 when the stock build-up of the previous year was reversed.

Welsh shut-down cuts U.K. sheet steel capacity by one third

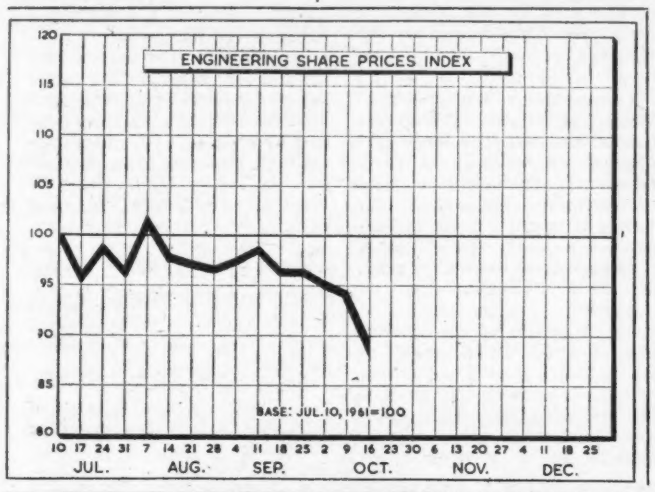
THE Steel Company of Wales' decision to shut down their Abbey and Margam works as the result of complications in a labour dispute meant the run-down of a third of all the sheet steel capacity in the U.K. With its two associated tin plate works, Trostre and Velindre, for which the great integrated plant provides raw material, some three-quarters of all the tin plate capacity of Britain was also affected.

The capacity of Abbey and Margam is 60,000 tons of steel a week.

Company production figures released at the end of last week show that output has fallen by almost 450,000 tons over the past year.

In the 12 months up to September 30, output of steel and coke was 7,941,000, against a total output of 8,387,000 in the preceding year.

The reduction occurred in coke, pig iron, steel ingots, sheets, plates and tinplate.



BABCOCK SHOCK: NO INTERIM DIVIDEND

INTERNATIONALLY KNOWN Babcock & Wilcox, £16 million designers and builders of water-tube boilers, nuclear reactor vessels and other equipment, are not paying an interim ordinary dividend. This occurs when their manufacturing activity is busier than earlier in the year and when the company order book is higher than at any time in the past four years.

The explanation, in the guarded company statement, lies in the results of the trading so far this year. The earlier low level of activity has had an effect, as have the position over the firm's nuclear contracts (now believed to have been provided for) and a number of outstanding claims on contracts still being discussed.

The essence of the statement from the Babcock board, for the future, is this: "Capacity in the boiler manufacturing industry is in excess of requirements and trading conditions are likely to remain highly competitive."

Conclusions on the final results for the year, says the board, would be unwise.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Oct. 16	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Oct. 16	Ch'ge	Y'ld p.c.
47/9	31/9	Allen, Edgar (£1)	32/6	–3d.	8.2	57/-	44/9	Lister, R.A. (£1)	48/9	–6d.	5.6
43/-	28/6	Allen, W. H. (£1)	27/-	–1/6	7.1	51/9	36/-	Mather & Platt (£1)	36/-	–6d.	6.0
77/-	58/6	Angus, George (£1)	65/-	...	6.1	67/-	47/6	Metal Industries (£1)	47/6	–3/3	6.2
31/10½	19/-	A.P.V. (10/)	29/3	...	3.8	71/3	53/4½	Morgan Crucible (£1)	59/9	–6d.	4.6
14/1½	8/10½	Asquith Machine Tool (5/)	10/-	–1/4½	2.4	31/-	20/-	Morris, Herbert (10/)	20/3	–6d.	7.8
48/6	29/-	Assoc. Electrical Ind. (£1)	29/-	–1/3	10.2	52/-	38/3	Murex (£1)	38/3	–1/6	6.7
16/5	11/8	Assoc. Engineering (5/)	12/3	...	5.4	49/6	40/6	Neepsend Steel (5/)	43/9	–1/3	5.8
110/-	83/-	Averys (£1)	85/9	–3d.	3.5	31/6	21/9	Newton Chambers (5/)	23/-	–2/3	4.2
36/9	20/-	Babcock & Wilcox (£1)	20/-	–3/9	...	41/3	21/3	Parkinson Cowan (£1)	22/6	+6d.	7.8
59/6	40/6	Baker Perkins (£1)	45/-	–3d.	5.0	72/9	47/-	Parsons, C. A. (£1)	47/9	–1/3	5.2
9/7½	5/10½d.	Beyer Peacock (5/)	6/3	...	9.2	40/3	38/-	Plessey (10/)	39/-	–2/6	3.8
77/-	45/-	Birfield (£1)	62/-	–6d.	3.2	33/-	16/-	Pressed Steel (5/)	16/-	–2/-	9.2
102/10½	68/3	Birmid Industries (£1)	68/3	–7/3	5.8	25/3	20/-	Qualcast (5/)	20/-	–9d.	4.4
36/10½	19/7½	Birmingham Small Arms (10/)	19/7½	–9d.	5.8	38/1½	23/-	Radiation (£1)	23/-	–1/-	8.6
45/6	33/6	Brockhouse, James (£1)	33/6	–2/3	7.2	22/6	14/-	Ransome & Marles (5/)	15/6	–1/-	4.3
28/9	22/2	Broom & Wade (5/)	25/6	–1/9	4.3	28/6	22/6	Ransomes, Sims & Jeffs (£1)	25/-	...	6.0
42/6	33/9	Brotherhood, Peter (10/)	33/9	–2/-	7.5	50/6	34/6	Renold Chains (£1)	40/-	–1/6	4.9
48/9	33/-	Brown, John (£1)	33/3	–1/9	6.5	52/3	38/-	Reyrolle, A. (£1)	38/-	–9d.	5.1
8/6	4/9	Cammell Laird (5/)	4/9	–3d.	...	9/1½	4/3	Richardsons Westgarth (10/)	4/6	+6d.	...
39/6	29/3	Carrier Engineering (5/)	31/3	–1/-	3.9	9/3	5/3	Roberts, Charles (5/)	5/3	–4½d.	...
54/3	36/6	Clarke Chapman (£1)	40/3	–9d.	6.7	48/6	40/6	Rolls-Royce (£1)	40/6	–2/3	5.3
14/9	9/9	Cohen, George (5/)	9/9	–3d.	6.3	32/6	21/6	Ruston & Hornsby (£1)	21/6	–1/3	8.1
33/10½	21/8	Coventry Gauge & Tool (10/)	29/7½	–1/4½	4.1	19/3	14/-	Serck (5/)	14/-	–3d.	4.4
12/3	7/6	Craven Brothers (5/)	7/6	–4½d.	5.6	23/9	12/7½	Shaw, Francis (4/)	14/3	...	5.5
24/-	17/6	Crofts Engineers (5/)	19/3	...	4.3	12/-	8/9	Sheepbridge Engrg. (5/)	9/3	–4½d.	7.7
39/7½	34/-	Davy-Ashmore (£1)	34/-	–5/7½	4.0	32/4½	19/1½	Simms Motor (5/)	22/3	–1/6	3.8
70/-	48/6	De La Rue (10/)	48/6	–2/6	4.5	44/1½	29/7½	Simon Engineering (5/)	35/6	–2/3	3.8
27/7½	19/9	Delta Metal (5/)	20/3	–1/3	4.9	23/9	14/3	Smith, S. & Sons (4/)	14/1½	–7½d.	5.5
68/9	50/-	Desoutter (5/)	55/-	...	3.0	15/3	12/-	Solar Industries (5/)	12/-	–3d.	7.1
41/3	31/9	Dowty Group (10/)	33/10½	–9d.	4.5	45/7½	26/3	Staveley Industries (£1)	28/-	...	8.0
32/10½	22/4½	Edwards High Vacuum (4/)	30/3	–1/-	1.9	32/6	18/6	Steel & Co. (5/)	27/10½	–1/-	4.0
52/-	36/-	Elec. & Musical Ind. (10/)	36/6	–2/-	4.7	67/-	49/-	Stone-Platt Ind. (£1)	49/-	–1/6	6.4
38/-	25/9	Elliott-Automation (5/)	34/-	–1/1½	1.9	20/4½	14/-	Tecalemit (5/)	14/-	–2/6	6.3
40/6	26/3	English Electric (£1)	26/3	–1/-	7.5	17/4½	12/7½	Thompson, John (5/)	12/7½	–7½d.	1.9
37/3	28/6	Firth Cleveland (4/)	28/6	–1/3	4.4	7/-	4/9	Thornycroft, John (4/)	5/-	–6d.	...
39/6	24/3	G.E.C. (£1)	24/3	–1/6	8.4	17/6	11/6	Toledo Woodhead (4/)	14/9	–3d.	5.3
65/-	42/9	General Refractories (10/)	50/9	–2/-	4.9	85/6	55/-	Tube Investments (£1)	55/-	–1/9	5.0
66/6	51/10½	Glenfield & Kennedy (£1)	51/10½	...	7.9	38/4½	27/-	Vickers (£1)	27/-	–6d.	7.3
108/7½	78/6	Guest, Keen & Nettlefold (£1)	79/6	–8/6	4.0	157/6	122/6	Walmsley (Bury) (£1)	128/9	–1/3	3.4
48/7½	26/6	Haden, G. N. (5/)	26/6	...	3.7	84/6	64/6	Ward, Thos. W. (£1)	68/-	–6d.	4.1
16/6	12/4½	Hall-Thermotank (5/)	12/4½	–3d.	4.4	17/9	12/3	Weir, G & J. (5/)	12/3	–6d.	7.2
24/-	15/6	Harland & Wolff (£1)	17/-	–3d.	5.8	47/6	31/1½	Wellman Smith Owen (5/)	31/1½	–2/10½	3.4
33/3	27/3	Hawker Siddeley (£1)	27/3	–1/1½	7.6	14/1½	10/3	West, Allen (5/-)	10/3	–7½d.	6.4
31/-	21/7½	Head Wrightson (5/)	21/7½	–9d.	3.6	46/3	25/6	Westinghouse Brake (£1)	25/6	–3/9	8.4
79/9	51/6	Herbert, Alfred (£1)	60/7½	–4/4½	4.5	36/6	19/6	Whessoe (5/)	19/6	–9d.	6.9
95/6	77/6	Hick Hargreaves (£1)	77/6	...	5.1	17/-	12/-	Wilmot-Breeden (5/)	13/6	–1/3	4.1
138/9	101/3	Hopkinsons (£1)	120/-	–1/3	4.5	30/-	20/-	Woodall-Duckham (5/)	20/6	–6d.	5.0
25/-	18/6	Howden, James (5/)	21/-	+6d.	5.8	64/9	44/6	Worthington-Simpson (10/)	50/-	...	4.9
33/9	23/-	International Combus (5/)	23/-	–7½d.	6.4						
		IRON AND STEEL									
43/6	25/7½	Brown Bayley (10/)	34/-	–9d.	4.6	42/-	25/1½	South Durham Steel (£1)	25/1½	–2/3	9.4
81/3	53/1½	Colvilles (£1)	49/-	–4/4½	6.4	47/8¼d.	32/4½	Steel Co. of Wales (£1)	32/4½	–3/1½	7.6
32/3	21/10½	Consett Iron (£1)	21/10½	–2/4½	8.5	57/4½	40/7½	Stewarts & Lloyds (£1)	40/7½	–3/9	7.3
43/7½	26/10½	Dorman Long (£1)	26/10½	–2/3	7.3	68/7½	42/1½	John Summers (£1)	42/1½	–3/1½	7.0
55/1½	39/1½	Firth & Brown (£1)	39/1½	–10½d.	6.3	55/7½	38/-	United Steel Cos. (£1)	39/7½	–4/6	6.1
49/10½	31/1½	Lancashire Steel (£1)	31/1½	–1/6	7.0	63/6	46/-	Whitehead Iron & Steel (£1)	46/-	–1/-	6.4

The companies whose share prices are quoted in the Engineering table and which form the basis of the index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the index.

NEW Companies

W. S. Atkins & Partners (Pakistan) Ltd., 10/11 Fetter Lane, London, E.C.4. To carry on the business of consulting engineers, etc. Nominal capital £100.

Richard Audrey Ltd., 239 Kilburn Park Rd., London, N.W.6. To carry on the business of heating engineers, etc. Nominal capital £10,000.

Export Supplies (Staines) Ltd., Fairfield House, Fairfield Avenue, Staines, Middx. To carry on the business of exporters and importers of mechanical and electrical goods and equipment. Nominal capital £1,000.

Parker Byrne Ltd., 4 Beech Ave., Bournemouth. To carry on the business of consulting engineers. Nominal capital £100.

Planet Instrument Company Ltd., 21 New Road, Brentwood, Essex. To carry on the business of precision engineers. Nominal capital £1,000.

Selbourne Products (Dudley) Ltd., New Rd., Dudley, Worcestershire. To carry on business of general engineers. Nominal capital £2,000.

S.E.M. Consultants Ltd., 9 Queen Victoria St., Reading, Berkshire. To carry on the business of structural, electrical and mechanical engineering consultants, etc. Nominal capital £1,200.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

Rising costs take toll of profits

WEEK IN THE CITY
BY OUR CITY EDITOR

AFTER the flurry which followed the cut in Bank Rate from 7 per cent. to 6½ per cent., stock markets have relapsed into gloom and prices have lost ground over a broad front. The setback in leading industrial shares since their May peak now exceeds 20 per cent.

For the moment, the Berlin situation and other world political problems are less important as a market influence than the trends in business.

It is the realisation that profits have stopped rising and may fall back substantially over the next few months that is having such a depressing effect.

There are, of course, exceptions to the general trend, but over a wide area of industry, including engineering, signs are multiplying that the rate of earnings on capital employed is becoming more and more difficult to maintain.

The twin pressures of keen competition and rising costs have been taking their toll of profits and in many cases have offset the benefits of increased turnover.

Moreover, the latest survey by the Federation of British Industries shows that businessmen are less optimistic about prospects than they were four months ago.

Publication of the FBI report served to deepen the "bearish" atmosphere in the City, as it has provided further evidence that the growth element has largely disappeared from ordinary shares. Selling has yet to become really heavy, but there has been a marked absence of buying interest.

Dividend change

For the future, much will depend on efforts to increase exports and strengthen the balance of payments. But even if exports do begin to show a strong advance profits are likely to be less buoyant than sales, as margins on exports are frequently smaller than in home trade.

The most notable item of engineering company news has been the decision of Babcock & Wilcox not to pay an interim dividend. For 1960, the company paid an interim of 4½ per cent followed by a similar final, making a total of 9 per cent, though this was not fully earned.

Trading results for 1961 to date have been affected by the low level of manufacturing activity in the early part of the year by nuclear contracts and by outstanding claims on contracts still under discussion.

The order book has improved and manufacturing activity has increased, but capacity in boiler making — Babcock's special field —is still above requirements.

Cheerful picture

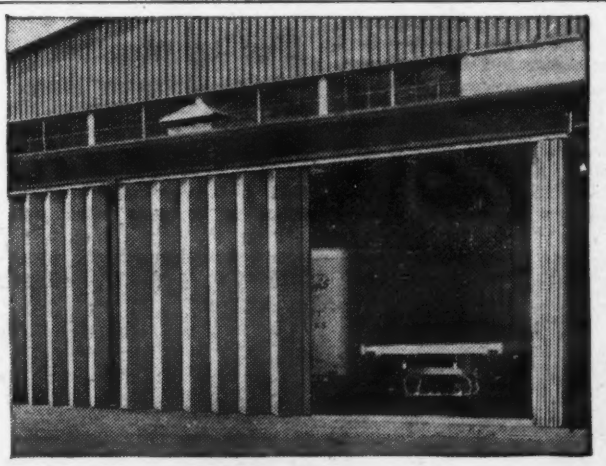
Results of Thos. W. Ward present a rather more cheerful picture, with turnover up by 5 per cent to a record £52 million. Although margins have been trimmed slightly, net earnings are up from £1,468,249 to £1,592,601 and the maintained 13¾ per cent dividend is 3¼ times covered.

One more example of a company that has spent heavily on capital investment and done well under the present difficult conditions is Smith's Stamping Works (Coventry).

Large suppliers of stamping dies and forgings to the car firms, the group has, nevertheless, been able to make a slight improvement in its trading profit over last year.

From 1960's trading profit of £524,000 there has been a modest improvement to £554,000.

In the 1959/60 year the Smith's Stamping Works put almost £250,000 into capital investment.



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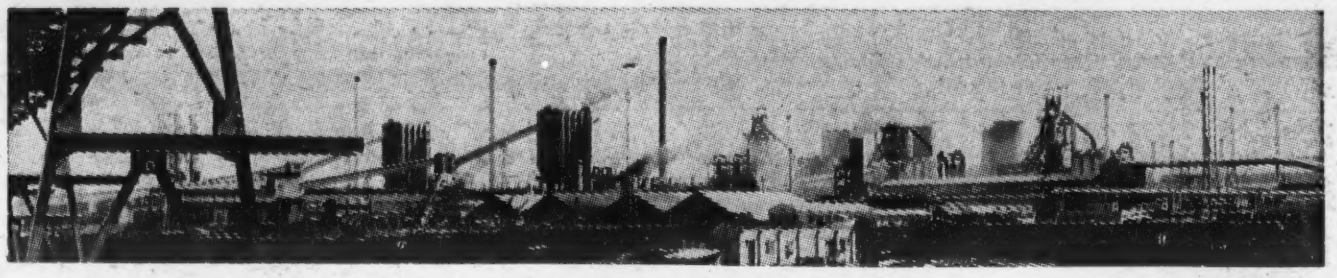
Picture right: coke ovens and blast furnace plants at Durgapur, India, the £120 million iron and steel works that is the biggest single export order ever executed by a group of British firms—with the help of the Export Credit Guarantee Department.



ECGD can supply background tips on 140,000 buyers

Credit aid for big and small

UNDER the present credit squeeze, the financing of exports enjoys a privileged position, and there seems unlikely — to say the least of it — to be any cutting down on that important export sales aid, the granting of credit to the overseas buyer.

This discrimination favour of export financing can only be readily exercised where the financing of export credit is distinct from general borrowing and is in the form of specific advances against export bills.

The facilitation of such financing is one of the chief benefits of the export credit insurance provided by the government's Export Credits (ECGD) Guarantee Department; in present circumstances ECGD may be expected to continue to attract fresh clients.

Big business

Already over 5,000 policyholders have a total annual face value exceeding £1,000 million. For the engineering industry, £213 millions worth of "machinery other than electric", representing 30 per cent of all such exports, were last year insured by ECGD, with a further £58.2 millions worth (representing 25 per cent) of electrical machinery and appliances insured over the same period.

A widespread misconception is that ECGD is only interested in the large firms—those with an export trade of hundreds of thousands of pounds a year.

Just how wrong this impression is can be judged from two facts. Firstly, over 900 of the Department's policyholders have an export turnover of less than £5,000 a year.

Secondly, ECGD offers a small exporter policy (introduced last April) which is specially designed for firms with an export turnover below £10,000 a year or for firms who have never exported but are prepared to enter overseas markets.

This new policy has proved to be an immediate success, in the four months since it was introduced over 325 policies have been sold.

Within the engineering industry these policies have been taken out by medium and small manufacturers in a wide variety of trades — pumps, valves, machine tools, steel springs, hosiery machinery, tap and screw precision gauges, and heating equipment—to name a few.

Under this policy an exporter can insure any single buyer—the department does not require him to insure all his business (or all his business in an agreed group of markets); an exporter obtains a flat 90 per cent cover of his risks; and under the "small exporter" policy there is a flat rate premium of 15s. per £100 of cover for any buyer in any country for which ECGD gives cover under its normal policies.

Policy choice

The "Small Exporter" policy is only one of the insurance policies which are available from the department, and the majority of ECGD's 5,000 odd policyholders hold a "comprehensive" policy, either for "contracts" which gives cover from time of order, or a "shipments" policy, which, at lower premiums, gives cover from date of shipment.

The comprehensive policy, either "contracts" or "shipments" version, covers the exporter against risks which include:

Insolvency of the buyer; buyer's refusal to pay within six months of due date for goods "accepted" by him; buyer's default on contract after export but before delivery and acceptance of the goods; action by a foreign government which blocks the transfer of payment in sterling to the exporter; loss through the imposition of fresh import licensing restrictions; war, revolution, or civil disturbance in the buyer's country; and against any other cause of loss occurring outside the U.K. and not within the control of the exporter or the buyer.

Author of this article, Philip Jones, O.B.E. of the Export Credits Guarantee Department which operates in confidence and with all the reserve of the City's insurance institutions. The department makes possible many export sales without its own name breaking into the news.

The latest facility introduced by the department is the export finance guarantee for the long-term financing of large capital projects, valued at over £2 million or in the case of ocean going ships about £1 million.

There are other benefits from an ECGD policy apart from protection against loss and assistance in obtaining bank finance; for example, policyholders' bills are often discounted at a finer rate by banks.

Apart from comprehensive and specific policies, ECGD offers policies to cover constructional works overseas, processing, overseas stockholding, external merchanting trade, payment of royalties by foreign firms, payment for services, sales from overseas stock, and sales to and by overseas subsidiary companies.

Further, a policyholder no longer has to play safe with the few buyers he has learnt to trust—or alternatively to demand "safe" payment terms from new buyers seeking the customary credit.

The cost of a comprehensive policy has been progressively reduced over the years, and today the average cost to exporters for insuring all business on up to six months credit is in the region of 7/8d. per £100, compared with 11/8d. in 1954. Also, for the exporter who insures his business with the department for three years there is a 5 per cent rebate.

Although the comprehensive policy is primarily designed for insuring goods on up to six months credit, "extended terms endorsements" to the policy are available, which give cover for up to five years credit on business meriting longer terms.

A condition of the comprehensive policy is that the exporter must insure with ECGD either all his overseas business or an agreed spread of markets. At present there are manufacturers in virtually every section of the engineering industry holding comprehensive policies.

For exporters of capital goods, where there is no established pattern of trade, there are specific policies; these are issued for the export of such items as large generators, tyre making plant, jute machinery, pulp and paper making plant and other large capital projects.

Any market

An ECGD policyholder is equipped to do business in any market and with any buyer accepted by the department as sound. He is no longer limited by his knowledge of conditions in a few markets; he has the benefit of ECGD's status enquiry service on buyers and the department's records in London cover 140,000 buyers in more than 160 markets throughout the world on which ECGD offers cover.

Records

Of these records, 70,000 are duplicated in every one of ECGD's 14 branch offices throughout the U.K. and on these staff can agree cover "off the cuff".

These records are constantly brought up to date by fresh enquiries, and inquiries on buyers not already covered are made through an international network of informants. The cost of this service is spread between the department's 5,000 policyholders, giving a service beyond the reach of even the largest exporter.

Although it is not possible to name the exporter (since all business between ECGD and its policyholders is on a confidential basis) one example will illustrate the rate at which a competitive firm can increase exports under ECGD cover.

Export boost

In August 1956 a manufacturer of guillotines and presses took out his first ECGD policy. In the previous year his export turnover, confined to one market, had been £3,000.

In the first year of his policy he went into two other markets and achieved a turnover of £27,000. Last year—his fourth insured year—his turnover was £82,000, and in the first nine months of the current policy year he has topped £97,000. His current average premium charges—for business in relatively sound markets—is around 6s. per £100 insured.

Perhaps the most important figure from an exporter's standpoint is the sum of over £4 million that ECGD paid out in claims last year to its policyholders.

Claims pay-out

An analysis of these claims payments show that £458,000 was because of insolvency, £1,010,000 because of default by private companies, £2,064,000 through defaults by foreign governments, £354,000 for transfer claims and £134,000 due to various other causes.

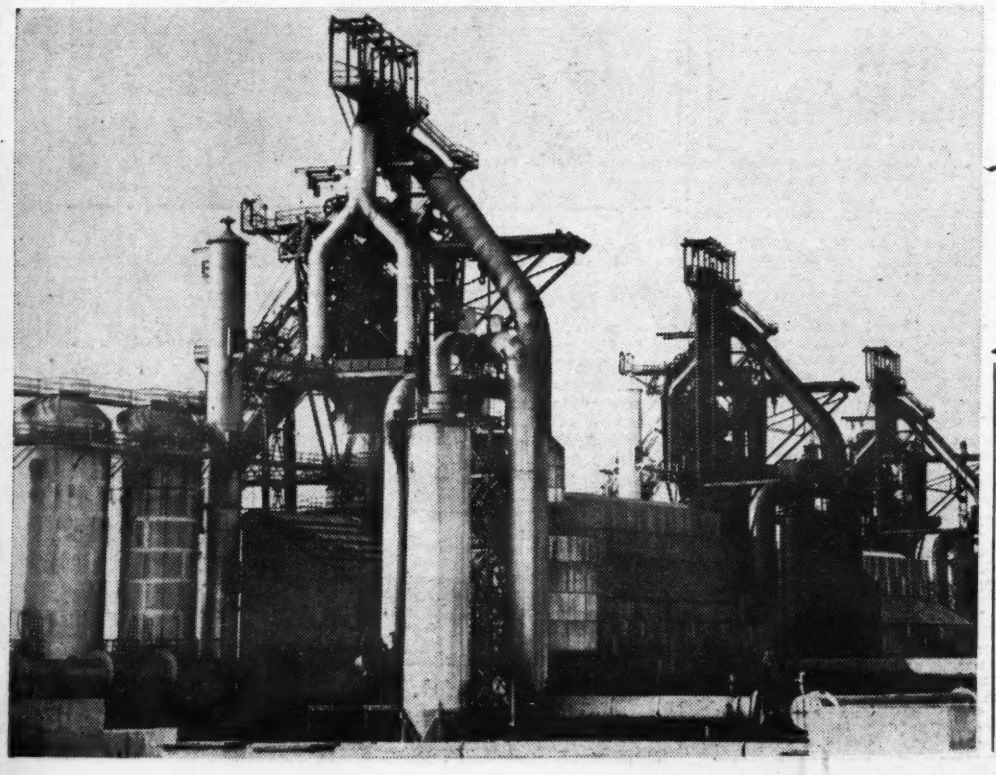
Already this year a policyholder in London has been paid £416,316 11s, 6d. in respect of a single claim. In these days of tight margins few exporters can afford substantial losses in overseas markets; the increase in ECGD's business over the past few years indicates that more and more businessmen are leaving their insurers to carry on the burden of export risks.

Non-profit

ECGD though seeking only to balance its books rather than to show a profit, makes every effort to behave commercially.

It is active in seeking new business because in this way costs of the insurance to the exporting community are progressively brought down.

Any of ECGD's 14 branch offices will send a representative to discuss an exporter's problems at his own office. These representatives have many years' experience in dealing with the export trade, and many exporters welcome a visit simply because the ECGD representative is "a useful person to talk to".



Left: Durgapur's three blast furnaces. The great steelworks, in West Bengal, is being built for the Government of India by the Indian Steelworks Construction Company—ISCON—a consortium of 13 of the U.K.'s principle engineering companies.

NUCLEAR SHIP

THE second meeting of the OECD European Nuclear Energy Agency's Study Group on ship propulsion concluded in Paris on Thursday.

The meeting considered possible reactor systems and types of ship which might form the basis of a joint European undertaking.

It was agreed that a more detailed examination should be made of a bulk-carrier, a tanker, and an oceanographic vessel.

9th INTERNATIONAL MATERIALS HANDLING EXHIBITION

Fork-lift trucks, conveyors dominate the 380 stands entered by eleven countries

Engineering News staffman **PETER KEMP** writes from **PARIS**

THE Ninth International Materials Handling Exhibition opened last Friday at the Palais de la Defense building in Paris. Over 380 exhibitors represented 11 countries.

Fork-lift trucks formed a large part of the mechanised handling equipment display. The emphasis in this equipment was on hydraulically operated adaptations replacing the conventional forks. These accessories included flat and curved clamps for crate and drum handling, with rotational control up to 360°.

A further improvement in forks was the introduction of a top horizontal clamp. This enables large packs of timber planking to be handled with the timber lengths in line with the truck.

Forks were also shown with side movement of approximately 30° either side of centre.

Faucheux showed a particularly useful clamshell grab unit for fork-lift trucks suitable for handling scrap metal and similar forms of material.

Other adaptations included fixed jib and hook, and tiltable buckets of about 1½ cu. yd. capacity. All conversions being fully usable within the normal fork-truck lift.

The Saxby "Miniwar" electric fork-lift truck was possibly one of the smallest in the show to have capacity for a seated driver. This truck can stack in 6ft. aisles and lift up to about 11ft. The distance between back of forks and rear of truck measures about 3ft. 6in.

Mobility was a feature of fork trucks by another manufacturer.

These trucks, with standing driver, were fitted with two castors under the forks and fully rotational rear driving wheels enabling the unit to be driven in almost any direction.

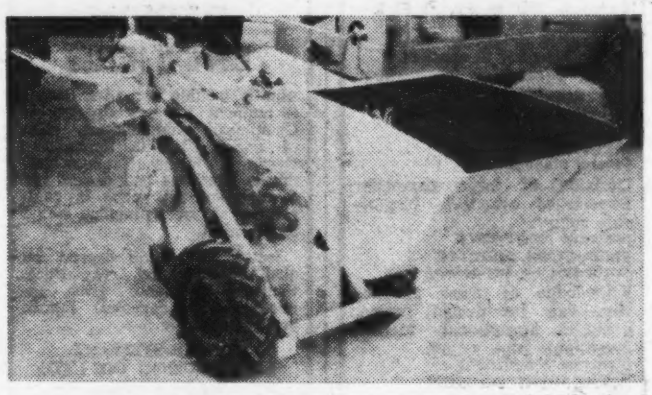
The French industry is manufacturing all types of driver-controlled fork-lift trucks, ranging in capacity from 500 to 10,000 kgs capacity.

The general trend appears to be in favour of diesel power units.

A small materials handling machine, the "Micropelle" was shown by La Technique Minière who introduced this model earlier this year. The machine, as shown in the photograph, is fitted with driving wheels at the front and a single castor at the rear.

Forward and reverse gears are incorporated, and with the castor the machine is extremely manoeuvrable. Bucket capacity is about 400lb with hydraulic lift and tilt.

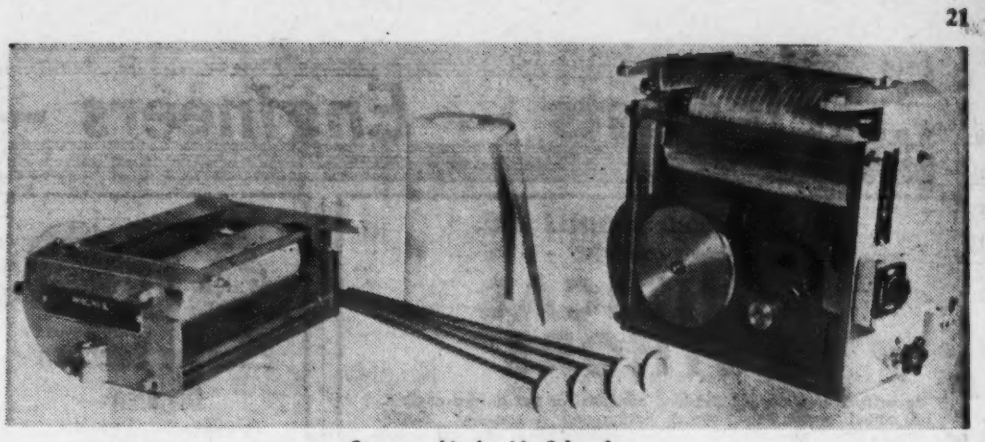
In the conveyor field, many forms were on show. Unequip's display featured a moulded-rubber conveyor belt with moulded-in corrugated side walls and divisions.



The "Micropelle" shown by La Technique Minière at the exhibition. Hydraulically operated raise and tilt bucket, and forward and reverse drive make this machine a good addition to contractors' plant.

This system is particularly useful for transporting powdered and granular materials without the necessity of a bucket conveyor installation.

The Seila-Eriez company showed a permanent-magnet system for incorporation in a belt conveyor. This is used for transporting ferro-magnetic parts such as cans, components and scrap material without special containers. The system allows transfer from one conveyor to another and elevation angles up to 90°.



Conveyor kit by M. Schmeder comprises variable speed driving unit and belt tensioning unit — adaptable to almost any working bench.

A packaged conveyor kit shown by M. Schmeder is adaptable to almost any working bench. This unit allows a conveyor to be set-up without the necessity of a permanent runway with quick change to varying requirements.

The unit is available in standard belt widths from 8 to 12in. and specials up to 3ft. 3in. wide.

The kit comprises: a power unit complete with motor, reduction gear and variable speed control—a belt tensioning unit, support legs and belt length complete with belt joints. Both driving and tension units are provided with means for bench attachment.

A selective automatic distributing conveyor was shown by Aspe-Dumont. Control panels on each conveyed table enable the load or component to be ejected at predetermined positions.

The Martonair S.A.R.L. company showed a range of pneumatic cylinders and associated operating equipment. These components were demonstrated in a mock-up machine for transfering cards by counting and weighing systems.

A positional controller was also shown by this company, capable of being attached to any air cylinder to provide a means of maintaining the cylinder in any one of an infinite number of positions within the stroke, irrespective of the load.

The adopted position is dependent upon an applied control pressure, usually between 3 and 15 p.s.i.

The system lends itself to widespread application in conjunction with process-control valves, dampers, louvres and similar devices, which are required to take up an aspect related to the output pressure of a transmitting instrument.

A typical example is the maintenance of constant level in a tank, subject to varying demand, where an air cylinder alters the degree of opening of a valve in response to a signal derived from a float-operated control instrument.

The controller may also be used as a pneumatic transmitter, when movement of the feedback arm results in a pressure output proportional to the displacement.

It is not necessary for the response of the controller to be linear. With suitable profiled cam arm, various types of non-linearity can be achieved.

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PRODUCTION ENGINEERING

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MECHANICAL HANDLING
Applicants should be Mechanical Engineers between the ages of 30/40 years with experience of mechanical handling and automatic control equipment.

TOOLS
The successful applicant will be responsible for the provision and design of all tools and dies and should be capable of producing working drawings.

DEVELOPMENT
Applicants between the ages of 25/35 years should possess H.N.C. in Mechanical Engineering with an endorsement in Chemical Engineering. Experience in drying and/or dust plant would be an advantage.

Applications, giving brief details, should be addressed to:
The Personnel Manager
MORGAN REFRACTORIES LIMITED
Neston, Wirral, Ches.
(A Member of The Morgan Crucible Group)

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Responsibility would include development of new ideas to final products stage, products and quality specifications and technical liaison with manufacturing sales and customers.

Applicants should be qualified to at least O.N.C. (Mech.), standard and must have either design or application experience in the Product field. A basic knowledge of Physics and Chemistry would be an advantage, but is not essential.

Situated West of London the position offers a starting salary of not less than **£1,000 per annum**, plus an annual bonus and Pension and Life Assurance Scheme. Applications in strict confidence.

BOX E.N. 101

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Our Company, which is engaged in the design, manufacture and operation of TONNAGE OXYGEN PLANT, invite applications for the above position. Applicants should have minimum H.N.C. (Mech.) or equivalent qualifications, and be experienced in engineering contract and manufacturing estimating in the process field. A knowledge of modern methods of welding and engineering economics is desirable. Please apply:

Personnel Manager
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49/50 Poland Street, London, W.1

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Personnel Manager,
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United Kingdom Energy Authority
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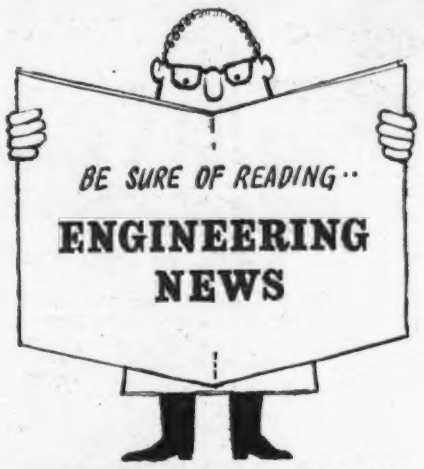

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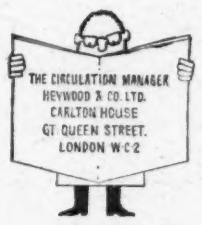

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AUTO-RECORD TENSILE UNIT

Smooth graph claimed to be accurate to within half per cent

A HIGH magnification autographic recorder has now been fitted by Samuel Denison and Son, of Leeds, to their standard universal dial type machine.

It gives an exceptionally smooth graph claimed to be accurate to within one half per cent and which has proved to be even more accurate in tests in the Denison machine.

It is known as the Denison-Baldwin-Wiedemann Autographic Stress-Strain Recorder and it can be used to test a wide range of specimens, e.g. round specimens from 0.001 in. up to 2 in. diameter and 0.005 in. strip.

High-temperature extensometers are also available for proof stress tests up to 900°C. This recorder can be fitted to recent machines now in service.

For proof stress determinations it is necessary to have an accurate method of measuring small deformations in the specimen.

Using an extensometer to produce the stress-strain curve, the specimen loading has to be interrupted to read the extensometer Such a test normally requires two operators and the curve has to be plotted after the test in order to get a proof stress.

One operator

By using a stress-strain recorder, however, the human element is eliminated, the process is fast and continuous, only one operator is required and a permanent record is automatically produced. The yield point is also accurately shown.

The recorder pen is directly connected to the final lever of the load weighing system hence the load record is as accurate as the machine.

A model MD-2 portable self-contained autographic recorder is available which can be fitted to all Denison dial tensile testing machines.

NCB EXPERIMENT ON TUNNELLING UNIT

THE erection of an 18ft. diameter experimental tunnelling machine, which is being developed by the Central Engineering Establishment of the National Coal Board and has been manufactured by Vickers - Armstrongs (Engineers) Ltd., commenced in December at the Cloud Hill Quarry of Breedon and Cloud Hill Limeworks.

The 300-ton, 700 h.p. machine has now been assembled and its components have been commissioned. Trials starting in July, will involve cutting about 800ft. into magnesium limestone.

This important development could have many applications such as for hydro-electric schemes, road driving, or even a Channel tunnel.

The machine consists of outer and inner contra-rotating heads on to which roller bits, similar to those used in oil-well drilling, are mounted.

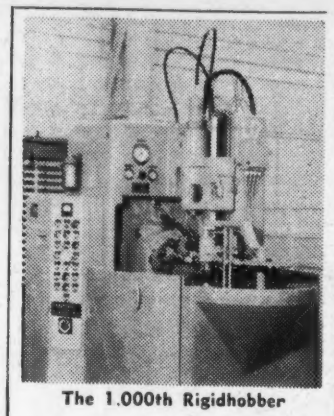
These heads are thrust against the tunnel face by hydraulic jacks which react against anchor pads hydraulically forced out against the sides of the tunnel.

Debris from the roller bits falls to the floor, is scooped up by buckets mounted on the outer rotating head and is delivered on to a plate conveyor which it carries to the rear of the machine.

SULPHUR FROM COAL GAS

ENGINEERS at the Bootle works of the North Western Gas Board are working on a gas purification system for the removal of hydrogen sulphide from gas and the recovery of sulphur.

Known as the Stretford System, the new technique is expected to find wide application in the chemical processing industries.



The 1,000th Rigidhobber

● Continued from front page

in a Lotus Elite car which was successfully raced by John Hobbs recently.

Two basic conditions must be fulfilled for the project to achieve its object. A high degree of overall accuracy must be maintained throughout manufacture, and the speed of production must be such as to permit the desired low cost to the motoring public.

At a time when a motor industryy is suffering from a particularly unfortunate series of setbacks, it is refreshing to learn that C.G.M. Ltd., who claim to have made over 80 per cent of the gear-making machinery used by the British automotive industry, have made a valuable contribution to an important new development.

This company has established itself, in a comparatively short space of time, as a major producer of gear machines capable of high output and accuracy on either batch or continuous production.

LATE NEWS
TEMple Bar 3422

Automatic drum unit

DRUM handling and spraying equipment designed to effect an automatic marshalling of drums has been installed in an Imperial Chemical Industries factory at Billingham.

The drum marshalling gear and automatic handling equipment up to the stage where the drums enter a Ballard oil-fired drying oven after spraying has been supplied by the Hymatic Engineering Co. Ltd., of Redditch, Worcestershire.

Daily output

Also included in this equipment is a double spraying booth and manually operated spraying equipment supplied by Alfred Bullows Ltd., of Walsall, Staffs., under subcontract to Hymatic.

The output of drums through this equipment is over 1,000 per day when both booths are in operation at the same time. These drums would be a maximum of 22in. diameter by 36in. long. When smaller drums are handled, with a diameter of 14in. by 18in. long the output increases to 1,600 per day.

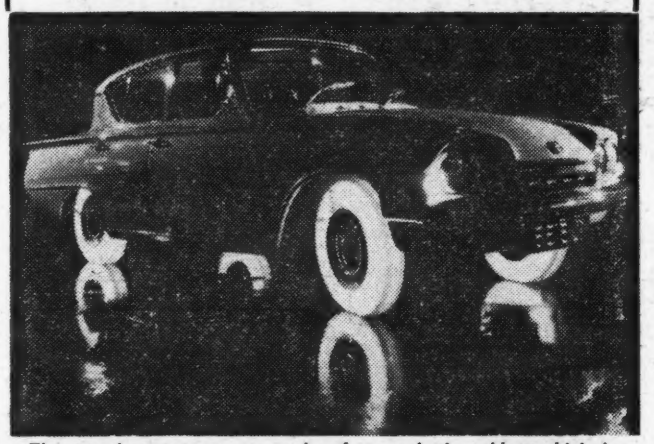
H & V call for unity

THE director of the Heating and Ventilating Research Association, Mr. N. S. Billington, wants to see an International Federation formed.

Speaking at a recent conference, he said, "The various contractor associations already have the International Union. The research workers have their study group.

"Only the professional engineers have no similar organisation. Let us explore now, ways in which some association, however loose, of the national engineering institutions concerned with heating and air conditioning can be formed. Let it be inaugurated before, or at least, when we meet again."

Illuminated, coloured tyres demonstrated



The translucent tyres are made of a synthetic rubber which is noted for its resistance to cutting, punctures and abrasion. They are dyed red, are lit from within by special wiring device.

ILLUMINATED coloured tyres may be the fashion for cars of the future. Translucent tyres were demonstrated for the first time in this country, in London, on Monday.

This tyre is the result of a two-year research project by The Goodyear Tyre and Rubber Co. but further research will be necessary before they can reach the market.

The tyres are made of specially compounded Neothane, a polyurethane synthetic rubber noted for its resistance to cutting, punctures and abrasions.

The raw materials are derived from petroleum and synthetic chemicals.

The tyres have already been road-tested at 65 m.p.h. and it is known from Goodyear's work so far that they provide first-class wearing potentialities.

Their smooth, glistening appearance, and receptiveness to virtually any colour, should open new opportunities for car designers.

In contrast to present-day tyres, the experimental Goodyear Neothane tyre is a solid piece of synthetic rubber, without fabric or laminations. The elimination of fabric makes production simpler and precise, quality control easier and allows less margin for error.

Eventually, if the experiment proves successful, the Goodyear translucent tyre means longer tyre-life and a more attractive tyre; with better riding qualities because of its simpler construction.

Capable of being lit from within while in use, the translucent type provides an added safety factor in addition to looking exotic. Indeed, tests have proved that the lighted tyres are readily visible from the side by oncoming motorist just as head and tail lights are visible from the rear.

This is nothing to what goes on inside a

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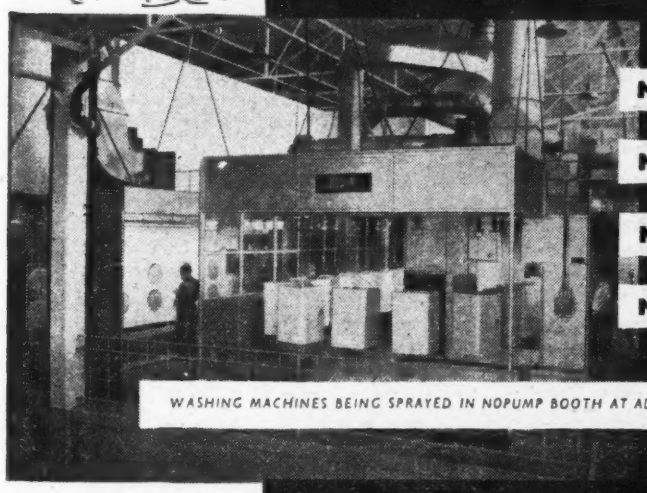

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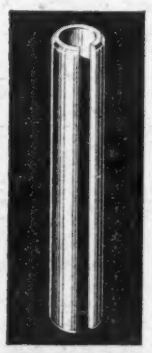

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